

andria razmaZis  
maTematikis institutis

2009 wl is

samecni ero angari Si

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andria razmaZis maTematikis institutSi amJamad aris cxra samecniero ganyofil eba: al gebris, maTematikuri l ogikis, geometria-topol ogiis, maTematikuri anal izis, diferencial uri gantol ebebis, maTematikuri fizikis, drekadobis maTematikuri Teoriis, Teoriul i fizikis, al baTobis Teoriisa da maTematikuri statistikis.

2009 wl is 31 dekembris monacemebiT institutSi iricxeba 69 mecnier-TanamSromel i, maT Soris 36 fizika-maTematikis mecnierebaTa doqtori (3 saqarTvel os mecnierebaTa akademiis akademikosi da 4 wevr-korespondenti) da 30 fizika-maTematikis mecnierebaTa kandidatia.

## Tavi 1. 2009 wl is sabiuj eto samuSao programebi

2009 wels institutSi muSavdeboda 9 sabiuj eto programa:

programa # 1: "harmoniul i da arawrfivi anal izis zogierTi probl ema, gamoyenebebi anal izur funqciaTa sasazRvro amocanebSi" (maTematikuri anal izis ganyofil eba)

programa # 2: "aral okal uri da sawyisi amocanebi Cveul ebrivi da hiperbol uri tipis kerZo warmoebul ebiani gantol ebebisatvis" (diferencial uri gantol ebebis ganyofil eba)

programa # 3: "Termomeqanikuri da el eqtromagnituri vel ebis urTierTqmedebis arakl asikuri amocanebi" (maTematikuri fizikis ganyofil eba)

programa # 4: "drekadobis Teoriis nawil obriv ucnoobsazRvriani da sakontaqto amocanebi; fil traciis Teoriis sivrciti RerZsimetriul i nawil obriv ucnoobsazRvriani amocanebi da bl anti arakumSvadi siTxis brunviT warmoqmnili rejimebi" (drekadobis maTematikuri Teoriis ganyofil eba)

programa # 5: "al gebrebis homotopiuri da kategoriul i Tvisebebi" (al gebris ganyofil eba)

programa # 6: "topol ogiur da al gebrul obieqtTa model ebi da maTi gamoyenebani" (geometria-topol ogiis ganyofil eba)

programa # 7: "intuicionisturi l ogikisa da modal uri sistemebis semantikuri anal izi" (maTematikuri l ogikis ganyofil eba)

programa # 8: "optimal uri investireba SezRudul i informaciis pirobebSi, robastul i hej ireba arasrul i finansuri bazris

semimartingal uri model ebisTvis da Tanmdevi statistikuri probl emebis gadaWra”  
(al baTobis Teoriisa da maTematikuri statistikis ganyofil eba)

programa # 9: “kvanturi vel ebis Teoriasa da mis gamoyenebebTan dakavSirebul i maTematikuri amocanebis kvl eva el ementarul i nawil akebisa da kondensirebul i garemos fizikaSi”  
(Teoriul i fizikis ganyofil eba)

## Tavi 2. samecniero grantebi

(a) 2009 wel s institutSi muSavdeboda saqarTvel os erovnul i samecniero fondis grantebiT dafinansebul i 11 proeqti

proeqti # **GNSF/ST06/3-004:** “al gebrul i da topol ogiuri struqturebi homotopiur da kategoriul al gebraSi, K-TeoriaSi da cikl ur homol ogiaSi” \_ xel mZRvanel i: xvedri inasariZe; ZiriTadi personal i: mal xaz bakuraZe, Tamar daTuaSvil i, dal i zanguraSvil i, nikol oz inasariZe, Tamaz kandel aki, baCuki mesabl iSvil i, zaza omiaZe, al eqsi paWkoria, zurab j anel iZe, emzar xmal aZe; damxmare personal i: giorgi raqviaSvil i, SoTa mel aZe, dimitri Cixl aZe, Tamar j anel iZe;

proeqti # **GNSF/ST07/3-169:** “harmoniul i da arawrfivi anal izis zogierTi sakiTxi arakl asikuri dasmiT da maTi gamoyenebebi diferencial ur gantol ebebSi” \_ vaxtang kokil aSvil i (proeqtis samecniero xel mZRvanel i), vaxtang paataSvil i (proeqtis menejeri), ZiriTadi personal i: I aSa efremiZe, al eqsandre mesxi, Saqro tetunaSvil i, al eqsandre xaraziSvil i, al eqsi kirTaZe;

proeqti # **GNSF/ST07/3-172:** “optimal uri marTvisa da statistikis martingal uri meTodebi finansur maTematikaSi” \_ Teimuraz toronj aZe (proeqtis samecniero xel mZRvanel i da proeqtis menejeri), ZiriTadi personal i: mixeil mania, nanul i I azrieva, Tengiz ServaSiZe, revaz TevzaZe, zurab cigroSvil i;

proeqti # **GNSF/ST07/3-174:** “I is al gebrebi da gansakuTrebul obaTa Teoria” \_ giorgi ximSiaSvil i (proeqtis samecniero xel mZRvanel i), al eqsandre el aSvil i (proeqtis menejeri), grigori giorgaZe (ZiriTadi personal i);

proeqti # **GNSF/ST07/3-175:** “kerZowarmoebul ebiani diferencial uri gantol ebebi hiperzedapirebze: garSta Teoriis gantol ebebi da maqsvel is sistema” \_ rol and duduCava (proeqtis samecniero xel mZRvanel i da proeqtis menejeri), ZiriTadi personal i: daviT

natroSvil i, daviT kapanaZe, Tengiz buCukuri, oTar Wkadua, I evan sigua.

proeqti # **GNSF/ST08/3-386:** "drekadobis Teoriis Sereul i da sakontaqto amocanebi, drekad sxeul Si Zabvebis optimal urad ganawil ebis amocanebi" \_ ZiriTadi personal i: revaz bancuri (proeqtis samecniero xel mZRvanel i), nugzar Savl ayaZe (proeqtis menej eri), giorgi kapanaZe, nana odiSel iZe;

proeqti # **GNSF/ST08/3-387:** "rgol ur speqtrTa cal keul i Tvisebebis mamodel irebel i al gebrul i struqturabis gamokvl eva" \_ ZiriTadi personal i: mamuka jibl aZe (proeqtis samecniero xel mZRvanel i), mal xaz bakuraZe (proeqtis menej eri), al eqsandre el aSvil i, Teimuraz firaSvil i, dimitri pataraia, revaz qurdiani;

proeqti # **GNSF/ST08/3-397:** "oradobis Teoria da misi gamoyenebebi arakl asikuri I ogikis semantikaSi" \_ ZiriTadi personal i: I eo esakia (proeqtis samecniero xel mZRvanel i), daviT gabel aia (proeqtis menej eri), guram beJaniSvil i, nikol oz beJaniSvil i, dimitri pataraia, mamuka jibl aZe;

proeqti # **GNSF/ST08/3-398:** "topol ogiur sivrceTa al gebrul i model ebi gansazRvrul i axal i koj aWvuri operaciebiT da maTi gamoyenebani homol ogiisa da homotopiis TeoriebSi" \_ ZiriTadi personal i: nodar berikaSvil i (proeqtis samecniero xel mZRvanel i), Tornike qadeiSvil i (proeqtis menej eri), samson sanebl iZe;

proeqti # **GNSF/ST08/4-400:** "vel is efeqturi Teoriis axal i ganvitareba barionebisTvis" \_ ZiriTadi personal i: al eqsandre kvinixize (proeqtis samecniero xel mZRvanel i), badri maRraZe (proeqtis menej eri), j ambul gegel ia;

proeqti # **GNSF/ST08/4-405:** "ZiriTadi mdgomareobis amocanebi kvanturi vel ebis TeoriaSi" \_ ZiriTadi personal i: merab el iaSvil i (proeqtis samecniero xel mZRvanel i), avTandil SurRaia (proeqtis menej eri), giorgi jorj aZe, al eqsandre kvinixize, giorgi I avrel aSvil i, giorgi ciciSvil i, arsen xvedel iZe, badri maRraZe.

(b) saqarTvel os erovnul i samecniero fondis grantebiT dafinansebul i sxva proeqtebi, roml ebSic monawil eoben institutis TanamSroml ebi

proeqti # **GNSF/ST07/3-170 (2008-2010):** ZiriTadi personal i maTematikis institutidan: T. buCukuri, a. gaCeCil aZe, r. gaCeCil aZe, r. duduCava, d. kapanaZe, o. Wkadua

proeqti # **GNSF/ST08/4-422 (2008-2010)**: I uwobis darRvevis kosmol ogiuri niSnebi adreul samyarosi, ZiriTadi personal i maTematikis institutidan gl avrel aSvil i

(g) 2009 wel s institutes TanamSromel Ta mier muSavdeboda agreTve ucxouri grantebiT dafinansebul i 9 samecniero Tema:

**INTAS Grant No. 06 – 1000017 – 8609** “K-theory, Non-Commutative Geometry, Homology Theories, Operator and Normed Algebras”, 2007-2009, x. inasariZe (xel mZRvanel i).

**GRDF/CRDF Grant No. GEP1-3339-TB-06** “Non-classical problems of fluid-elastic cusped plate (beam) interaction”, s. xaribegaSvil i.

EPSRC—Engineering and Physical Sciences Research Council grant EP/H020497/1 “Mathematical Analysis of Localised Boundary- Domain Integral Equations for Variable Coefficient Boundary Value Problems” (2009-2012). ZiriTadi Semsrul ebel i o. Wkadua.

Volkswagen Foundation grant I/84 328 “arakomutaciuri al gebra-geometria-topol ogia”, 2009-2011, xel mZRvanel i x. inasariZe.

SCOPES Grant, Testing fundamental physics with cosmology, December 1, 2009- November 30, 2012; Project Swiss co-ordinator M.Shaposhnikov (EPFL, Lausanne), Georgian Team Leader T.Kahniashvili (Ilia State University), Semsrul ebel i g. I avrel aSvil i

The Russian Foundation for Basic Research, grant No. 07-01-00660, “Компьютерный анализ совместности систем уравнений с приложением к квантовым вычислениям, калибровочным моделям теории поля и численному решению уравнений в частных производных” xel mZRvanel i v. gerdti, Semsrul ebel i: a. xvedel iZe

The Ministry of Science and Education of the Russian Federation, grant No. 5362.2006.2 Развитие и применение аналитических и численных методов в физике высоких энергий, астрофизике и прикладной математике xel mZRvanel i d. Sirkovi, Semsrul ebel i a. xvedel iZe

## Tavi 3. ZiriTadi samecniero Sedegebis mokl e daxasiaTeba

### maTematikuri anl izis ganyofil eba

**programa # 1:** harmoniuli da arawrfivi anal izis zogierTi probl ema, gamoyenebebi anal izur funqciaTa sasazRvro amocanebSi

**programis koordinatori** \_ maTematikuri anal izis ganyofil ebis gamge, mTavari mecnier-TanamSromeli, saqarTvel os mecnierebaTa akademiis wevr-korespondenti vaxtang kokil aSvili;

**programis Semsrul ebl ebi** \_ mTavari mecnier-TanamSromeli al eqsandre xaraziSvili, ufrosi mecnier-TanamSromeli I aSa efremize, ufrosi mecnier-TanamSromeli vaxtang paataSvili, ufrosi mecnier-TanamSromeli omar Zagnize, ufrosi mecnier-TanamSromeli givi xuskivaZe, ufrosi mecnier-TanamSromeli al eqsandre mesxi, mecnier-TanamSromeli eTer gordaZe, mecnier-TanamSromeli Saqro tetunaSvili, mecnier-TanamSromeli al eqsi kirTaZe.

1. 2009 wels damTavrebul i Temebis ZiriTadi Sedegebi

a) institutis 2009 wl is samuSao programiT gaTval iswinebul i samuSaoebis ZiriTadi mecnieruli Sedegebi

1. gamokvleula karl esonis wirze gansazRvruli kal deronis singul aruli integral is SemosazRvrul oba cvl admaCvenebl ianierTi l ebegis sivrcidan meoreSi [128].
2. gamokvleula araerTgvarovan sivrceebze gansazRvruli integral uri gardaqmnebis SemosazRvrul obis sakiTxebi moris sivrceebSi funqciuri maCvenebl ebiT [131].Y
3. damtkicebul ia feier-risis Teorems matriculi anal ogi [32].
4. SemoRebuli da gamokvleulia furies trigonometriuli mwkrivebis Sej amebadoba funqciuri matricebiT gansazRvruli meTodebiT [92].
5. damtkicebul ia jon-nirenbergis tipis utol oba ergoduli sistemebisaTvis [33].
6. ori cvl adis funqciebisaTvis SemoRebulia sigl uvis cneba da dadgenilia erT romel ime wertil ze absoluturad krebadi ormagi trigonometriuli mwkrivis orjer integrebiT miRebuli mwkrivis jamis yvel gan gl uvoba [28].
7. SemoTavazebulia rimanis meTodiT Sej amebadobis iseTi ganzogadeba, romelic regul arulia erT romel ime wertil ze absoluturad krebadi ormagi trigonometriuli mwkrivebis kl asSi. SemoRebulia meore simetriuli kerZo warmoebebl ebis cnebebi da dadgenilia maTi kavSiri rimanis meTodiT Sej amebadobasTan TiToeuli indeqsis mimarT [19].

8. I orencis wonian sivrceebSi dadgenilia funqciisa da misi warmoebul ebis ganzogadebuli azriT sigl uvis modul is Sefasebebi trigonometriuli polinomebiT saukeTeso miaxl oebebiT. aRmoCenilia sivrcis metrikis gavlena Sesabamis Sefasebebze [130].
9. SemoRebulia TiTqmis zomadi funqciis cneba l ebegis kl asikuri zomis mimarT. es cneba sakuTrivad moicavs l ebegis azriT zomadi funqciis cnebas. dadgenilia, rom yovel i TiTqmis zomadi funqcia fardobiTad zomadia l ebegis zomis yvel a gagrZel ebaTa kl asis mimarT [3, 52].
10. gamokvleulia metrikuli tranzituloba da maSTan dakavSirebuli sxva mniSvelovani Tvissebebi  $\sigma$ -sasrulo invariantuli da kvaziinvariantuli zomata oj axis namravlebis SemTxvevaSi [50].
11. gamokvleulia funqciata zomadobis sakiTxebi raime konkretuli zomis yvel a gagrZel ebaTa kl asis mimarT da am sakiTxebTan dakavSirebuli funqciis grafikis masiuroba [3, 52, 66].
12. gamokvleulia sakmarisi pirobebi imisa, rom garkveul simravleebze gansazRvruli funqciis grafiki iyos masiuri zomata oj axis namravlis mimarT [66].
13. miRebulia orwoniani amocanebis amoxsnebi farTo kl asis integraluri gardaqmnebisatvis namravliani gul ebiT. pirvel ad maTematikur literaturasi dadgenilia erTwoniani l ebegis sivrcidan meoreSi SemosazRvrulobis kriteriუმები j eradi hardis gardaqmnebisა da cal mxrivi potencial ebisatvis gul is arsebiti, erTze naklebi singul arobebit, j eradi risis potencial ebisatvis. monotonuri wonebis wyvil ebisatvis napovnia optimal uri pirobebi, romlebic uzrunvel hyofen orwoniani utol obebis marTebul obas hil bertis j eradi gardaqmnebisა da furies gardaqmnebis mul tiplikatorebisatvis. gadaWrilia kval is probl ema wil aduri Zlieri maqsimal uri funqciebisatvis da j eradi wil aduri integral ebisatvis. miRebuli Sedegebi gamoyenebulia furies operatorTa normebis Sefasebebis dadgenisatvis arastandarduli, orwoniani dasmebit. saxel dobr, furies trigonometriuli erTmagi da j eradi mwkrivebis nebismieri dadebiti rigis Cezarosa da abelis saSual oebis normebisatvis miRebulia iseti utol oebi, romel Ta sxvadasxva mxares sivrceebis macvneblebi da wonebi sxvadasxva; damtkicebulia zemoxsenebuli mwkrivebis wrfivi metodebit Sej amebadobis aucilebeli da sakmarisi pirobebi. Ganzogadebulia bernSteinis cnobili utol oebi trigonometriuli polinomebisა da sasruli rigis mTel i funqciebis warmoebul ebisatvis orwoniani normebis CarCoebSi [1, 71].
14. gamokvleulia zomis gagrZel ebis zogadi amocana da namdvil mniSvelobiani funqciebis strukturuli Tvissebebi zomata konkretuli kl asebis mimarT. dawvrilebitaa ganxil uli zomis gagrZel ebis amocanis sami Ziritadi aspeqti: wminდა simravლur-Teoriuli, algebruli da topologiuri. nacvnebia am aspeqtebs Soris mWidro kavSiri. Seswavl ilia fardobiTad



- zomadi da absol uturad arazomadi namdvil mniSvnel obiani funqciebi. axal i meTodis gamoyenebiT agebul ia l ebegis kl asikuri zomis sxvadasxva Tvisebis mqone araseparabel uri gagrZel eba, damtkicebul ia paTol ogiuri yofaqcevis mqone funqciebis (magal iTad, serpinski-zigmundis tipis funqciebis) fardobiTi zomadoba zomaTa garkveul i kl asebis mimarT [3].
15. miRebul ia maqsimal uri, potencial is da singul arul i operatorebis arakompakturobis zomis (arsebiTi normis) Sefasebebi wonian l ebegis sivrceebSi. aRniSnul i amocanebi Seswavl il ia rogorc erTwoniani, aseve orwoniani dasmiT. zogierT SemTxvevaSi naCvenebl ia, rom mocemul i operatori ar aris kompakturi erTi woniani sivrcidan meore wonian sivrceSi. cal mxrivi potencial ebisa da singul arul i integral ebisaTvis miRebul ia arsebiTi normebis orwoniani Sefasebebi im SemTxvevaSi, roca es operatorebi moqmedebs cvl admaCvenebl ian wonian l ebegis sivrceebSi [4].
  16. zomian kvazimetrikul sivrceebze gansazRvrul i wil aduri intgeral ebisaT-vis dadgenil ia SemosazRvrul oba moris sivrceebSi wonebiT. kerZod, dam-tkicebul ia sobol evis tipis Teorema, amoxsnil ia kval is amocana. wonis Se-saxeb miRebul i daSvebebi aucil ebel ia da sakmarisi im SemTxvevaSi, roca zoma akmayofil ebs gaormagebis pirobas [34, 131].
  17. damtkicebul ia eqstrapol aciiis erTi Teorema da miRebul Sedegze dayrd-nobiT ganzogadebul ia l itl vud-pel is cnobil i Teorema furies mwkrivTa dekompoziciis Sesaxeb orlicis modul arebisaTvis [67].
  18. maqsimal uri funqciebisa da singul arul i integral ebisaTvis dadgenil ia erTi woniani cvl admaCvenebl iani l ebegis sivrcidan meoreSi SemosazRvrul obis optimal uri pirobebi modul arebis terminebSi [29].
  19. furies integral ebis Sej amebadobis saSual oebisaTvis dadgenil ia orwoni-ani Sefasebebi rogorc erTganzomil ebian, aseve mraval ganzomil ebian SemT-xvevaSi [42,43].
  20. ganzogadebul ia hol omorful funqciaTa i. vekuas warmodgenebi aragl uvsazRvriani areebisaTvis. miRebul Sedegze dayrdnobiT amoxsnil ia riman-hil -bert-puankares amocana uban-uban gl uvsazRvrian areebSi iseT koSis tipis integral iT warmodgenad funqciaTa kl asSi, romel Ta simkvriveebi miekuTvnebian cvl admaCvenebl ian l ebegis wonian sivrceebSi [72].
  21. naxevar sivrceze gansazRvrul i ganzogadebul i maqsimal uri funqciebisa da potencial ebisaTvis dadgenil ia erTi woniani cvl admaCvenebl iani l ebegis sivrcidan meoreSi SemosazRvrul obis aucil ebel i da sakmarisi pirobebi. miRebul i Sedegebi axal ia kl asikuri l ebegis sivrceebisaTvis [9, 130].
  22. gawrfevad wirze gansazRvrul i koSis singul arul i integral ebisa da maq-simal uri funqciebisaTvis dadgenil ia wonian "grand" l ebegis sivrceebSi SemosazRvrul obis kriteriუმები [68,69,70].

23. amoxsnil ia riman-hil bertis amocana uban-uban gl uvsazRvrian cal adbmul areebSi im koSis tipis integral ebis kl asebsi, romel Ta simkvriveebi mieku-Tvnebian wonian cvl admaCvenebi l ebegis sivrceebis; miRebul ia amoxsna-dobis srul i suraTi; gamovl enil ia arafredhol muri SemTxvevebi da saz-Rvris geometriis gavl ena amoxsnadobis xasiaTze; amoxsnadobis SemTxvevaSi amonaxsnebi agebul ia efeqturad [73].
24. SemoTavazebul ia axal i meTodi, roml is gamoyenebi Tac SesaZl ebel i xdeba invariantul i zomebis araseparabel uri gagrZel ebis farTo kl asis ageba. am meTodis safuZvel ze mniSvnel ovnad ganzogadebul ia s. kakutanisa da j. oqstobis kl asikuri Sedegi l ebegis zomis araseparabel uri invariantul i gagrZel ebis arsebobs Sesaxeb. kakutani-oqstobis meTodisagan gansxvavebiT, gamoyenebul ia winda simravl ur-Teoriul i midgoma, romel ic s. ul amis transfinituri matricis Tvisebebs efuZneba [50].
25. sxvadasxva avtoris mier (v. serpinski, S. fxakaZe, h. fridmani da sxv.) Seswavl il i iyo iseTi brtyel i wertil ovani simravl ebis kl asi, romel Ta maxa-siaTebel i funqciebis ganmeorebiTi integral ebi arsebobs da erTmaneTis tol ia. dadginda aRniSnul kl asSi Semaval i funqciebis garkveul i Tvisebebi da aseTi funqciebis yofaqceva maTematikuri anal izis standartul i operaciebis mimarT. amave dros Riad rCeboda Semdegi sakiTxi: aris Tu ara aRniSnul i kl asi masSi Semaval i funqciebis namravl ebis mimarT Caketil i? naCvenebia, rom d. martinis aqsiomis daSvebiT pasuxi am kiTxvaze uaryofiTia [51].
26. Semotanil ia eqstremal urad masiuri grafikis mqone namdvil mniSvnel obiani funqciis cneba da Seswavl il ia aseTi funqciebis zomadobis sakiTxebi da maTi yofaqceva maTematikuri anal izis standartul i operaciebis mimarT. sa-xel dobr, naCvenebia, rom nebismieri aseTi funqcia fardobiTad zomadia l e-begis zomis yvel a SesaZl o gagrZel ebaTa kl asis mimarT. meores mxriv, d. martinis aqsiomis daSvebiT damtkicebul ia, rom arsebobs ori eqstremal urad masiuri grafikis mqone funqcia, romel Ta jami absol uturad arazomadia gagrZel ebaTa aRniSnul i kl asis mimarT [52].
27. ganxil ul ia iseTi brtyel i wertil ovani simravl eebi, roml ebsac aqvT garkveul i erTgvarovnebis Tviseba maTi vertikal uri da horizontal uri kveTebis mimarT, e.i. am tipis simravl is yvel a vertikal uri (Sesabamisad, horizontal uri) kveTa erTidaimave zomisa. amave dros, ar gamoiricxeba is SemTxvevac, roca vertikal uri da horizontal uri zomebi erTmaneTisagan gansxvavdeba da, maSasadame, gansaxil avi simravl e ar aris zomadi l ebegis azriT. damatebiTi simravl ur-Teoriul i hipoTezebis daxmarebiT, gamokvl eul ia aRniSnul simravl eTa kl asi da dadgenil ia am tipis simravl eebis mWidro kavSiri v. serpinskis cnobil konstruqciebTan, roml ebic kontinuumis hipoTezas eyrdnoba. garda amisa, vertikal uri da horizontal uri kveTebis zomebis tol obis SemTxvevaSi,

- agebul ia Sesabamisi I ebegis azriT zomadi brtyel i simravl eebi da naCveneblia maTi kavSiri e.w. rekursiul fraqtal ebTan (mag., serpinskis xal iCasTan) [55].
28. ganxil ul ia I ebegis zomis invariantul gagrZel ebaTa Teoriis erTi konkretul i sakiTxi, romelic dRemde Ria probl emad rCeboda. saxel dobr, damtkicebul ia, rom yovel i natural uri  $k > 1$  ricxvisaTvis arsebobs  $k$  raodenobis ugul ebel yofadi wertil ovani simravl e, romel Taganac nebismieri  $k-1$  simravl e SeiZl eba gavxadoT zomadi I ebegis zomis garkveul i invariantul i gagrZel ebis mimarT, magram ar arsebobs I ebegis zomis arc erTi invariantul i gagrZel eba, romlis mimarTac yvel a es  $k$  simravl e aris zomadi [54].
  29. dadgenilia parametrze damokidebul operatorTa mimdevrobis zogierTi Tviseba. am Tvisebebidan, rogorc Sedegi, gamordinareobs furies jeradi trigonometriul i mwkrivebis cvl admaCvenebl iani boxner-risis saSual oebis mTel i rigi aproqsimatul i Tvisebebi [92].
  30. dazustebul ia aproqsimaciis Sebrunebul i utol obebi wonian I ebegis sivr-ceebSi cvl adi maCvenebl ebiT; gamovl enilia sivrcis metrikis gavlena Sesa-bamis Sefasebebze [74].
  31. analizur funqciaTa Teoriis gadaadgil ebiani sasazRvro (hazemanis) amocanis amoxsnadobis sakiTxebi gamokvl eul ia im koSis tipis integral iT war-modgenad funqciaTa kl asSi, romel Ta simkvriveebi miekuTvnebian wonian I ebegis sivrceebis cvl adi maCvenebl ebiT [144].
  32. miRebul ia gare analizuri matric-funqciebisaTvis biorling- l aqs-hel sonis Teoremis axal i martivi original uri damtkiceba, romelic eyrdnoba mxol od kompl eqsuri cvl adis funqciaTa Teoriis meTodebs [21].

## diferencial uri gantol ebebis ganyofil eba

**programa # 2:** aral okal uri da sawyisi amocanebi Cveul ebrivi da hiperbol uri tipis kerZo warmoebul ebiani gantol ebebisaTvis

**programis koordinatori** \_ diferencial uri gantol ebebis ganyofil ebis gamge, mTavari mecnier-TanamSromeli, akademikosi **ivane kiRuraZe**;

**programis Semsrul ebl ebi** \_ mTavari mecnier-TanamSromeli **sergo xaribegaSvil** i, ufrosi mecnier-TanamSromeli **mal xaz aSordia**, ufrosi mecnier-TanamSromeli **givi berikel aSvil** i, ufrosi mecnier-TanamSromeli **j ondo gvazava**, ufrosi mecnier-TanamSromeli **nino farcvania**, ufrosi mecnier-TanamSromeli **oTar j oxaze**, mecnier-TanamSromeli **giorgi kvinikaZe**.

## ZiriTadi mecnierul i Sedegebis mokl e mimoxil va

institutis programiT gaTval iswinebul i samuSaoebi. dasrul da Tema: aral okal uri da sawyisi amocanebi Cveul ebrivi da hiperbol uri tipis kerZo warmoebul ebiani gantol ebebisaTvis-, romel ic ganyofil ebaSi muSavdeboda 2007 wl idan. saangariSo wel s:

optimal uradaa arweril i meore rigis arawrfiv diferencial ur gantol ebaTa kl asebi, romel Tac gaaCniaT wesieri da fetqebadi amonaxsnebi [124].

maRal i rigis arawrfivi diferencial uri da funqcional ur-diferencial uri gantol ebebisaTvis rogoorc rezonansul, ise ararezonansul SemTxvevaSi dadgenil ia periodul i amocanis amoxsnadobisa da cal saxad amoxsnadobis aragaumj obesebadi sakmarisi pirobebi [126,143,145].

periodul koeficientebiani organzomil ebiani wrfivi diferencial uri sistemebisaTvis napovnia erTaderTi periodul i amonaxsnis arsebobis optimal uri pirobebi [127].

araavtonomiuri arawrfivi diferencial uri sistemebisaTvis ganxil ul ia aral okal uri amocanebi, SemoRebul ia garkveul i woniT maTi koreqtul obis cneba da napovnia aragaumj obesebadi pirobebi, roml ebic saTanadod uzrunvel yofen arniSnul i amocanebis amoxsnadobasa da koreqtul obas [125].

arawrfivi diferencial uri sistemebisaTvis fazuri cval debis mimarT swarafad zrdadi marjvena mxareebiT dadgenil ia trivial uri amonaxsnis barbaSin-krasovskis azriT gl obal urad mdgradobis optimal uri pirobebi [62].

ganzogadebul i wrfivi diferencial uri sistemebisaTvis araintegrebadi singul arobebiT dadgenil ia sasazRvro amocanaTa cal saxad amoxsnadobis efeqturi sakmarisi pirobebi [93].

meore rigis wrfiv hiperbol ur sistemaTa erTi kl asisaTvis sibrtyeze gamokvl eul ia zogierTi aral okal uri amocana. napovnia pirobebi amocanis monacemebze, roml ebic uzrunvel yofen mis koreqtul obas garkveul wonian funqciur sivrceebSi [122].

garkveul i orientaciis mqone konusur areSi Seswavl il ia sasazRvro amocana arawrfiv tal Ris gantol ebaTa erTi kl asisaTvis. napovnia pirobebi arawrfivobis Semcvel wevrze, roml ebic uzrunvel yofen amocanis amonaxsnis arsebobasa da erTaderTobas. ganxil ul ia agreTve SemTxvevebi, roca amonaxsni ar arsebobs [123].

liuvil is ganzogadebul i arawrfivi gantol ebisaTvis miRebul ia koSis amocanis amonaxsnis erTaderTobis, sigl uvis, l okal uri amoxsnadobis, gl obal uri amonaxsnis arsebobisa da ararsebobis pirobebi [120].

born-infel dis kl asis monaTesave gantol ebebisaTvis dasmul i aral okal uri maxasiaTebel i amocanisaTvis naCvenebia Zl ieri parabol uri gadagvarebis Sesazl ebl oba amocanis amonaxsnis gavrcel ebis areSi mdebare Sekrul wirebze, roml ebic sazRvraven mistvis SeuRwevad qveareebis. amocanis parametrebis terminebSi miRebul ia iqna amgvvari wirebis arsebobis sakmarisi pirobebi [44].

puasonis gantol ebisaTvis gamokvl eul ia aral okal uri amocana integral uri SezRudvit da dirixl es pirobiT sazRvris nawil ze. energetikul

utol obaTa meTodis gamoyenebiTDamtKicebul ia Sesabamisi sxvaobiani sqemis cal saxad amoxsnadoba da  $O(h^2)$  rigiT krebadoba [12].

**sagranto proeqtebiT gaTval iswinebul i samuSaoebi.** Seswavi il ia sawyis-sasazRvro amocana rigis gadagvarebis mqone hiperboluri gantolebisaTvis, romelic aRwers wamaxvilebuli Zelis dreakad mdgomareobas. sobolevis Sesabamis wonian sivrceSi damtkicebul ia am amocanis koreqtuloba [104].

ganxiluli a sitxisa da dreakadi sxelis urTierTqmedebis maTematikuri modelebi. damtkicebul ia Sesabamisi sasazRvro amocanebis koreqtuloba sobolevis sivrceSi [103].

### **maTematikuri fizikis ganyofil eba**

**programa # 3:** Termomeqanikuri da el eqtromagnituri vel ebis urTierTqmedebis araki asikuri amocanebi

**programis koordinatori** \_ maTematikuri fizikis ganyofil ebis gamge, mTavari mecnier-TanamSromeli, fizika-maTematikis mecnierebaTa doqtori **rol and duduCava;**

**programis Semsrul ebi ebi** \_ ufrosi mecnier-TanamSromeli **Tengiz buCukuri**, ufrosi mecnier-TanamSromeli **rol and gaCeCil aZe**, ufrosi mecnier-TanamSromeli **oTar Wkadua**, mecnier-TanamSromeli **avTandil gaCeCil aZe**, mecnier-TanamSromeli **davit kapanaZe**.

**ZiriTadi mecnieruli Sedegebis mokle mimoxil va**

**institutis programiT gaTval iswinebul i samuSaoebi.** Seswavi il ia diferencialuri gantolebebi hiperzedapirebze giunteris da stoqsis operatorebis aRricxvaze dayrdnobiT, rac sagraZnoblad amartivebs rogorc diferencialuri operatorebis warmodgenas, aseve maT gamokvleवास. am midgomiT Seswavi il ia kl asikuri amocanebi l apl as-bel tramis da l ames operatorebisaTvis, miRebul ia maTTvis kl asikur sasazRvro amocanaTa amoxsnadobis, amoxsnebis erTaderTobis Teoremebi da isini da isini miyvanebian equivalenturad cal saxad amoxsnad sasazRvro fsevdodiferencialur gantolebebtan [27].

parametriqsis saSual ebiT Seswavi il i iqna cvladkoeficientiani skal aruli diferencialuri gantolebisaTvis dasmul i dirixles, neimanis da Sereuli amocanebis Sesabamisi integraluri gantolebebi (Boundary-Domain Integro-Differential Equations). naCvenebsa sasazRvro amocanebisa da Sesabamisi integraluri gantolebebis equivalentoba. Seswavi il ia integraluri gantolebebis Sebrunebadoba. aseve gamokvlebul ia lokalizebul i parametriqsis saSual ebiT miRebul i lokalizebul i integralur gantolebaTa sistemebi (Localized Boundary-Domain Integro-Differential Equations). Ddamtkicebul ia sasazRvro amocanebisa Dda Sesabamisi integraluri gantolebebis equivalentoba. naCvenebsa lokalizebul i integraluri gantolebaTa sistemis Sesabamisi operatoris Sebrunebadoba. [21,22,23,105,107].

## sagranto proeqtebiT gaTval iswinebul i samuSaoebi

gamokvl eul ia el eqtrodkadobis Teoriis Sereul i da bzaris tipis amocanebi. aseve Seswavi lia metalisa da piezoelqtruli sxel ebis urTierTqmedebis amocanebi bzariT sakontaqto zedapirze. potencialTa da fsevdodiferencial ur gantol ebaTa meTodis saSual ebiT damtkicebul ia amocanebis amonaxsnebis arsebobisa da erTaderTobis Teoremebi. Seswavi lia amonaxsnebis asimptoturi Tvisebebi. kerZod, mniSvnel ovani transversal urad izotropuli kl asis SemTxvevaSi miRebul ia amonaxsnis singularobis gamosaTvl el i efeqturi formul ebi Bbzaris wibos maxl obl obaSi, im wiris maxl obl obaSi sadac icvl eba sasazRvro pirobebi da sakontaqto Dzedapiris sazRvris maxl obl obaSi. Amonaxsnis singularoba damokidebul ia rogorc drekad mudmivebze aseve piezo da diel eqtrikul mudmivebze. Aamave dros amonaxsens oscilacia ar gaaCnia. Ees aris is efeqtebi romelic ar gaaCnia amonaxsnebs kl asikuri drekadobis Teoriis SemTxvevaSi. [16,17,15].

Seswavi lia maqsvelis anizotropuli sistemisTvis, rodesac el qtruli  $\varepsilon$  da magnituri  $\mu$  SeRwevadobebi warmoadgenen  $3 \times 3$  matricebs, fizikurad rel evanturi magnituri da el qtruli sasazRvro amocanebi. aRsaniSnavia rom aseTi anizotropuli SemTxvevisaTvis saerTod ar iyo cnobili zommerfelis tipis pirobebi usasrul obaSi romelic uzrunvel yofda sasazRvro amocanebis amoxsnis erTaderTobas. proporciuli SeRwevadobebisaTvis  $\varepsilon$  da  $\mu$  moxerxda aseTi pirobis miReba [18], rac uxsnis gzas gamokvl evebs amoxsnis arsebobis dasadgenad.

Semdeg naSromSi [106], romelic male gadaecema dasabeWdad da romelic ukve moxsenebul ia ramdenime konferenciaze, dadgenilia fsevdorxevis SemTxvevaSi (roca rxevis sixSiris parametri aris kompl eqsuri sidide) maqsvelis sistemis eqivalentoba or el ifsur sasazRvro amocanasTan. maqsvelis sistemis amoxsna warmodgenilia rogorc am ori sasazRvro amocanis amoxsnaTa jami, rac izl eva saSual ebas dadgindes amoxsnis zusti asimptotika gaxsnili zedapiris SemTxvevaSi. es naSromi iyenebs winamorbedi naSromis [27] Sedegebs.

gamokvl eul ia drekadobis Teoriis statikisa da dinamikis sasazRvro-sakontaqto amocanebs erTgvarovani hemitropuli sxel ebisTvis. ganxil uli amocanebi pirobiTad SeiZeba davyoT or jgufad. statikisa da dinamikis sasazRvro-sakontaqto amocanebi. maTSi mxedvel obaSi miRebul i xaxunis Zal ebi, kerZod, drekadi sxel is sasazRvris dadebiTi zomis nawil ze an mTel sazRvarze gaTval iswinebul ia xaxunis efeqti, romelic aRiwereba kul onis kanonis meSveobiT. Mmeore jgufis amocanebs miekuTvneba ori drekadi erTgvarovani hemitropuli sxel is cal mxrivi kontakts amocanebi bunebrivi SeuRwevadobis pirobis gaTval iswinebiT, e.i. rodesac deformaciis Sedegad erTi sxel i ar iWreba meoreSi. Ggamokvl eul ia zusti amonaxsnebis arsebobis, erTobis da amocanis monacemebze damokidebul ebis sakiTxi. ganxil uli sakontaqto amocana drekad da myar sxel s Soris, rodesac myar sxel is sakontaqto zedapiri amozneqilia da kontakti aRiwereba pirobiT, romelic siniorinis pirobebisgan gansxvavebiT ar monawileobs arc drekadi da arc myari sxel is normal i. [38,39,22,115].

## drekadobis maTematikuri Teoriis ganyofil eba

**programa # 4:** drekadobis Teoriis nawil obriv ucnobsazRvriani da sakontaqto amocanebi; fil traciis Teoriis sivrciTi RerZsimetriul i nawil obriv ucnobsazRvriani amocanebi da bl anti arakumSvadi siTxis brunviT warmoqmnil i reJimebi

**programis koordinatori** \_ drekadobis maTematikuri Teoriis ganyofil ebis gange, mTavari mecnier-TanamSromel i, saqarTvel os mecnierebaTa akademiis wevr-korespondenti **revaz bancuri**;

**programis Semsrul ebl ebi** \_ ufrosi mecnier-TanamSromel i **sergei kukuj anovi**, ufrosi mecnier-TanamSromel i **avTandil cicqisvil i**, ufrosi mecnier-TanamSromel i **nugzar Savl ayaZe**, mecnier-TanamSromel i **lida gogol auri**, mecnier-TanamSromel i **l uiza Safaqize**.

**ZiriTadi mecnierul i Sedegebis mokl e mimoxil va**

**institutis programiT gaTval iswinebul i samuSaoebi.** programa moicavs 2006-2010 wl ebs. 2009 wel s:

Seswavi lia drekadobis brtyeli Teoriis nawil obriv ucnobsazRvriani amocana oradbmuli arisaTvis, romlis sazRvrebis Sedgeba wrfivi monakveTebisa da saZiebeli rkal ebisagan. sazRvris wrfiv nawil ebze moqmedeben sworfuZiani absoluturad myarigi uvi Stampebi, xolo saZiebeli rkal ebi Tavisufalia gare datvirTvisagan. sazRvris ucnob nawil ze tangencialuri normaluri Zabva mudmivia. Kkonformuli gadasaxvis gamoyenebiT amocana miyvanilia riman-hilbertis amocanaze wriuli rgolistvis. Amocanis amonaxsni mocemulia kvadraturebSi [10].

Ggamokvulia idealuri siTxis dinebis Wavli Teoriis sivrciTi ReZsimetriuli nawil obriv ucnobsazRvriani zogierTi klasis amocanebis amonaxsnebis agebis metodebi [159,60,153].

Seswavi lia drekadobis Teoriis sakontaqto amocanebi uban-uban erTgvarovani izotropuli firfitisaTvis [11,89], rodesac drekadi CarTva mdebareobs gamyof sazRvarze an marTobulad kveTs mas. CarTvaze moqmedebs tangencialuri datvirTva. Gganxilulia agreTve uban-uban erTgvarovani ortotropuli firfita, rodesac CarTva gadis gamyof sazRvarze.

miRebuli integro-diferencialuri gantolebebi daiyvanebian analizur funqciaTa Teoriis sasazRvro amocanebze (wrfivi SeuRlebis amocana, karlemanis tipis amocana da sxv.)

miRebulia cxadi amoxsnebi da gamokvulia sakontaqto Zabvebis yofaqceva CarTvis bol oebSi.

agreTve ganxilulia dinamikuri sakontaqto amocana drekadi CarTvis mqone firfitisaTvis, rodesac masze moqmedebs horizontaluri da vertikaluri harmoniuli datvirTvebi [90].

Gganxilulia grZeli winaswar dagrexili ortotropuli cilindruli garsebis Tavisufali da izulebiti rxevebi. SeSfoTeba gamowveulia nebismeri normaluri harmoniuli datvirTviT. amoxsnis

dros gamoyenebul i iqna furies meTodi. miRebul ia amonaxsnebis miaxl oebiTi mniSvnel oebeli. [75,76,136].

Seswavi il i iqna temperaturul i gradientis gavlena or forovan cil indrs Soris moTavsebul i siTxis dinebis mdgradobaze. Ggamokvleul ia aramdgradobebi da gadasvlebi forovan cil indrebs Soris siTxis dinebaSi, rodesac dinebaze moqmedebs radianul i dineba da radianul i temperaturul i gradienti [148].

Seswavi il ia optimaluri konturebis moZebnis amocana drekadi kvadratisaTvis, romelic Sesustebul ia Tanabradmtkice oTxi ucnobi xvrel iT [41].

## al gebris ganyofil eba

**programa # 5:** al gebrebis homotopiuri da kategoriuli Tvisebebi.

**programis koordinatori** \_ al gebris ganyofil ebis gamge, mTavari mecnier-TanamSromeli, akademikosi **xvedri inasariZe**;

**programis Sensruli ebi** \_ ufrosi mecnier-TanamSromeli **Tamar daTuaSvili**, ufrosi mecnier-TanamSromeli **nikol oz inasariZe**, ufrosi mecnier-TanamSromeli **Tamaz kandelaki**, ufrosi mecnier-TanamSromeli **baCuki mesabliSvili**, mecnier-TanamSromeli **al eqsi paWkoria**, mecnier-TanamSromeli **dali zanguraSvili**, mecnier-TanamSromeli **emzar xmalaze**, mecnier-TanamSromeli **guram donaZe**.

### a) institutis programiT gaTvaliswinebuli samusaebi

axali midgomiT agebulia  $C^*$ -al gebrebis sasruli bivariantuli K-Teoria da miRebulia brauder-karubi-lambris Teorema misi ementebis rigis Sesaxeb. mTel ricxvTa rgolis mul tiplikaciuri monoidisaTvis agebulia da gamokvleulia axali bivariantuli K-Teoriebi, romlebsac vuwodebT grexvis da racionalur KK-Teoriebs da romlebic ukavSirdebian kasparovis bivariantuli K-Teorias grZeli zusti mimdevrobit. garda amisa baum-konis hipoteza Camoyalibebuliasasruli, grexvis da racionaluri versiebis terminebSi (x.inasariZe da T.kandelaki).

monaxul ia racionaluri modulebis da komodulebis urTierTkavSiris winda kategoriuli arwera da misi ganzogadeba zogadkategoriebSi. mocemul ia galuas Teoriis ganzogadeba zogadi kategoriebisaTvis. moxerxda bial gebrebis da hopfis al gebrebis ganzogadeba zogadkategoriebSi (b.mesabliSvili).

jgufebis jvaredini modulisaTvis agebulia jgufuri al gebrebis jvaredini moduli da Sesabamisad SeuRlebuli funqtorebis wyvili jgufebisa da erTeuliani asociuri al gebrebis jvaredini modulebis kategoriebs Soris. Seswavi il ia polinomuri funqtorebis warmoebuli funqtorebis zogierTi Tviseba. kerZod, gamoTvil ia maTi xarisxi calkeul SemTxvevebSi da kavSiri simpliciur xarisxTan (n.inasariZe).



Seswavl il ia moqmedebis sakiTxi al ternatiul i al gebrebis kategoriaSi. es kategoria warmodgenil ia rogorc interesis kategoria. agebul ia konkretul i magal iTebi, romel TaTvis Cvens mier zogadi interesis kategoriaSi adre agebul i universal uri mkacri zogadi aqtori ar warmoadgens al ternatiul al gebras, da amastan ar akmayofil ebs moqmedebis pirobebs al ternatiul i al gebrebisTvis. ganmartebul ia al gebrebi damatebiTi frCxil is operaciIT da puasonis ormxrivi pirobiT. Seswavl il ia aseTi al gebrebis kategoria, kerZod Tavisufal i obieqtebis konstruqcia, moqmedebis sakiTxi, gafarToebebi. agebul ia aseTi al gebrebis kohomol ogiis Teoria, misi Tvissebebi, kavSiri l aibnicis, hoxSil dis da al gebrebis frCxil is operaciIT kohomol ogiebTan (T.daTuaSvil i).

damtkicebukl ia, rom koeficientebian hoxSil dis homol ogias gaaCnia amokveTis Tvisseba, roca al gebris ideal i aris H-unitarul i. miRebul ia Sebrunebul i debul ebac (g.donaZe).

damtkicebul ia naxevradmodul ebis proeqciul i rezolventebis Sedarebis axal i Teoremebi da maTi gamoyenebiT gamoviTval eT zogierTi kerZo saxis monoidis kohomol ogiis monoidebi (apaWkoria).

gagrZel da kvl evebi l aibnicis da l is n-al gebrebis homol ogiuri Tvissebebis Sesaswavl ad. kerZod, dasabuTebul ia, rom l aibnicis kompl eqsiT agebul i l aibnicis n-al gebrebis homol ogia izomorful ia quil enis homol ogiisa l aibnicis n-al gebrebisaTvis. Cexis warmoebul i funqtorebis Teoriis gamoyenebiT miRebul ia hopfis formul ebi l aibnicis n-al gebrebis maRal i rigis homol ogiebisaTvis. es Sedegi miRebul ia aseve naxevradabel uri kategoriebis homol ogiebis konteqstSi, kategoriul i gal uas Teoriis gamoyenebiT. paral el urad anal ogiuri Teoria ganviTarebul ia l is n-al gebrebisaTvis da gamokvl eul ia agreTve fardobiTi SemTxveva – l aibnicis n-al gebrebis homol ogiebi l is n-al gebrebis qvemraval nairobis mimarT (e.xmal aZe).

cxadi saxiT aRweril ia topol ogiuri V-al gebrebis kategoriaSi, sadac V universal uri al gebrebis naxevrad-abel uri mraVal nairobaa, romelic akmayofil ebs garkveul pirobebs, zogierTi. SemuSavebul ia al gorITmul i midgoma universal uri al gebrebis mraVal nairobebSi efeqturi kodawebis morfizmebis aRweris sakiTxisadmi (d.zanguraSvil i).

## **b) erovnul i samecnieoro grantebiT Sesrul ebul i samuSaoebi**

warmatebiT dasrul da saqarTvel os erovnul i samecnieoro fondis grantis GNSF/ST06/3-004 (al gebrul i da topol ogiuri struqturabi homotopiur da kategoriul al gebrebSi, K-TeoriaSi da cikl ur homol ogiaSi, 2007-2009) proeqtiT gaTval iswinebul i sami wl is (12 kvartl is) sakiTxebi.

T.daTuaSvil i, n.inasarize da e. xmal aZe iyvnen mivl inebul i santiago de kompostel as universitetSi da vigos universitetSi (espaneTi) erovnul i grantiT grantiT gaTvel iswinebul i samecniero samuSaos Sesasrul ebl ad.

#### **g) sazRvargareTul i grantebiT Sesrul ebul i samuSaoebi**

warmatebiT Sesrul da saerTaSoriso grantis INTAS – 06 – 100017 – 8609 (K-theory, Non-Commutative Geometry, Homology Theories, Operator and Normed Algebras, 2007-2009) proeqtiT gaTval iswinebul i pirveli 18 Tvis sakiTxebi.

T.daTuaSvil i, n.inasarize da e.xmal aZe iqnen mivl inebul i santiago de kompostel as universitetSi da vigos universitetSi (espaneTi) INTAS-is grantiT gaTvel iswinebul i samecniero samuSaos Sesasrul ebl ad.

warmatebiT mimdinareobs saerTaSoriso Gfol qsvagenis fondis grantis I/84 328 (arakomutaciuri al gebra-geometria-topologia, 2009-2011) proeqtiT gaTval iswinebul i ori wl is sakiTxebze muSaoba.

### **geometria-topol ogiis ganyofil eba**

**programa # 6:** topol ogiur da al gebrul obieqtTa model ebi da maTi gamoyenebani

**programis koordinatori** \_ geometria-topol ogiis ganyofil ebis gamge, ufrosi mecnier-TanamSromeli, fizika-matematikis mecnierebaTa doqtori **Tornike qadeiSvil i**;

**programis Semsrul ebl ebi** \_ mTavari mecnier-TanamSromeli **nodar berikaSvil i**, mTavari mecnier-TanamSromeli **giorgi ximSiaSvil i**, ufrosi mecnier-TanamSromeli **mal xaz bakuraZe**, ufrosi mecnier-TanamSromeli **al eqsandre el aSvil i**, ufrosi mecnier-TanamSromeli **vaxtang l omaZe**, ufrosi mecnier-TanamSromeli **samson sanebl ize**, mecnier-TanamSromeli **sul iko xaJomia**, mecnier-TanamSromeli **zurab Todua**, mecnier-TanamSromeli **manana miqiaSvil i**.

#### **ZiriTadi mecnierul i Sedegebis mokl e mimoxil va**

agebul ia procedura cal adbmul i sivrcis maryuJTa sivrcis mTel ricxovani homol ogiebis gamosaTvl el ad (n. berikaSvil i).

naCvenebia rom Tavisufali maryuJTa sivrcis betis ricxvebi (mTel i ricxvebis mimarT) SemousazRvrel ia maSin da mxol od maSin roca

mocemul i sasrul ganzomil ebiani sivrcis kohomol ogiur al gebras aqvs ori mainc mul tiplikaturi warmomqmneli (s. sanebl ize).

დადგენილია კრიტერიუმები ასახვის მუდმივთან ჰომოტოპიურობისათვის inducირებულ იკოჰომოლოგიური ჰომომორფიზმის გამოყენებით და მოცემულია მისი ერთი გამოყენება კომპლექსური ვექტორული ფიბრაციის ტრივიალურობისათვის Černის მაქსიმალური კლასების თერმინების (ს. სანელიძე).

გამოთვლილია ბინარული ადპოლიედრული ჯგუფებისთვის მორავის K-თეორია (მ. ბაკრაძე).

ტრანსფერის გამოყენებით სხვადასხვა ჰომოლოგიის თეორიებისთვის (მ. ბაკრაძე).

სესვალი იყო სახსრული მექანიზმებისა და ტენსორების ტიპის კონსტრუქციების კონფიგურაციული სივრცეები და ექსტრემალური კონფიგურაციები (გ. ხიმშიაშვილი).

სევისვალი იყო სფერული მრავალკუთხედები (გ. ხიმშიაშვილი).

## მათემატიკური ლოგიკის განყოფილება

**პროგრამა # 7:** ინტუიციონისტური ლოგიკისა და მოდალური სისტემების სემანტიკური ანალიზი

**პროგრამის კოორდინატორი** – მათემატიკური ლოგიკის განყოფილების გამგე, უფროსი მეცნიერ-თანამშრომელი, ფიზიკა-მათემატიკის მეცნიერებათა კანდიდატი **ლ. ეოსაკია**;

**პროგრამის ხელმძღვანელი** – უფროსი მეცნიერ-თანამშრომელი **მამუკა ჯიბლაძე**, მეცნიერ-თანამშრომელი **ნიკოლოზ ბეჯანიშვილი**, მეცნიერ-თანამშრომელი **დავით გაბელია**, მეცნიერ-თანამშრომელი **დimitრი პატარაია**.

### ზრტიანი მეცნიერული სივრცის მოკლე მიმოხილვა

შემოდებული და გამოკვლეულია მესერთა განსაზღვრადი სისრულის ცნება, განსაზღვრადად სრული ჰაიტინგის ალგებრების მეშვეობით მიღებულია ტოპოლოგიის ფარდობითი განაწილებების დახასიათება.

მიღებულია კომპაქტური ბულისა და ჰაიტინგის ალგებრების სავსებით არაბმულობის ახალი დამტკიცება, რომელიც გვერდს უვლის პეტერ-ვეილის თეორემის გამოყენებას.

გამოკვლეულია სტოუნის სივრცეების, კომპაქტურად ჰაუსდორფის სივრცეების, სუსტად გაიშვიათებული სტოუნის სივრცეებისა და სუსტად გაიშვიათებული კომპაქტურად ჰაუსდორფის სივრცეების კლასების შესაბამისი მოდალური სისტემები. მიღებულია შესაბამისი აქსიომატიზაციები. ეს შედეგები აღწერილია ნაშრომში „The Modal Logic of Stone Spaces: Diamond as Derivative”, რომელიც მიღებულია დასაბეჭდად ჟურნალში Review of Symbolic Logic.

გამოკვლეულია K4.Grz მოდალური სისტემის ტოპოლოგიური სემანტიკა ზღვრის ოპერატორის ტერმინებში და დადგენილია, რომ ეს სისტემა სრულია მემკვიდრეობით დაუშლადი ტოპოლოგიური სივრცეების კლასის მიმართ.

განხილულია პეანოს არითმეტიკის დამტკიცებადობის ოპერატორის პოლინომიალური მოდიფიკაციები და გამოკვლეულია შესაბამისი მოდალური სისტემების ალგებრული სემანტიკა.

მოცემულია ზახარიაშჩევის კანონიკური ფორმულების სრული ალგებრული დახასიათება.

აღწერილია ZFC თეორიის ყველა იმ წინადადებათა მესერი, რომლებიც მდგრადია ფორსინგული გაფართოებების მიმართ.

მოცემულია მოდალურად განსაზღვრადი ტოპოლოგიური კლასების სტრუქტურული დახასიათება საბაზო და გაფართოებული მოდალური ენებისთვის. თითოეულ შემთხვევაში მოდალური ენა შედარებულია ტოპოლოგიურ პირველი საფეხურის ენას და დახასიათებულია ამ ენის შესაბამისი ფრაგმენტი.

## al baTobis Teoriisa da maTematikuri statistikis ganyofil eba

**programa # 8:** optimal uri investireba SezRudul i informaciis pirobebSi, robastul i hejireba arasrul i finansuri bazris semimartingal uri model ebisTvis da Tanmdevi statistikuri probl emebis gadaWra

**programis koordinatori** \_ al baTobis Teoriisa da maTematikuri statistikis ganyofil ebis gamge, ufrosi mecnier-TanamSromel i, fizika-maTematikis mecnierebaTa doqtori **mixeil mania**;

**programis Semsrul ebl ebi** \_ ufrosi mecnier-TanamSromel i **nanul i lazrieva**, ufrosi mecnier-TanamSromel i **Teimuraz totonj aZe**, ufrosi mecnier-TanamSromel i **Tengiz ServaSiZe**, mecnier-TanamSromel i **omar furTuxia**, mecnier-TanamSromel i **zurab cigroSvil i**.

**ZiriTadi mecnierul i Sedegebis mokl e mimoxil va**

**institutis programiT gaTval iswinebul i samuSaoebi.**

Seswavi l ia sargebl ianobis maqsimizirebis amocana nawil obriv dakvirvebad SemTxvevaSi eqsponencial uri miznobrivi funqciisTvis. naCvenebia, rom es amocana ekvivalenturia iseTi eqsponencial uri optimizaciis amocanis, romelic gamosaxulia dakvirvebadi procesebis terminebSi. Aam ukanasknel i amocanis fasis funqciisTvis gamoyvanil ia stoqasturi bel manis gantol eba da mocemul ia optimal uri strategiis konstruqcia [81].

miRebul ia minimal uri entropiis martingal uri zomis daxasiaTeba Seqceul i stoqastur diferencial uri gantol ebis amoxsnis terminebSi [82].

Seswavl il ia pol iakis gasaSual ebis proceduris asimptoturi yofaqceva robins-monros tipis stoqasturi diferencial uri gantol ebis amonaxsnis gamoyenebiT. naCvenebia, rom Sesabamis normirebul process gaaCnia asimptoturi eqspansia, rac saSual ebas gvaZl evs martingal ebisTvis central uri zRvariTi Teoremidan miviRoT asimptoturi ganawil eba [137].

pirobiTi ganawil ebaTa ergodul i wesiT SerCevisas raime fiqsirebul i ganawil ebis sasrul i raodenobis wrfiv gardaqmnaTa Soris, damoukidebel i SemTxviti veqtorebis normirebul i j amebis zRvariTi normal urobis krameriseul i pirobekidan bunebriv SezRudvebSi miRebul ia pirobiTad damoukidebel i SemTxviti veqtorebis normirebul i j amis ganawil ebis normal uri aproqsimaciis siCqaris kl asikuri tipis Sefaseba [78].

ganzogadoebul ia okone-hausman-kl arkis formula puasonis funqcional ebisaTvis da dadgenil ia integrandis cxadi saxe [86].

Seswavl il ia meore rigis el ifsuri tipis diferencial uri gantol ebis amonaxsnis arsebobisa da erTaderTobis sakiTxebi hil bertis sivrceSi [87].

## **erovnul i samecniero grantebiT Sesrul ebul i samuSaoebi**

Seswavl il ia saSual o kvadratuli hejirebis amocana SezRudul i informaciis pirobekSi, rodesac dakvirvebadi nakadi ar Seicavs srul informacias sabaziso aqtivis fasze. SemoRebul ia axali tipis martingal uri gantol eba da optimal uri strategia daxasieTebul ia am gantol ebis amonaxsnis saSual ebiT [80].

ganxil ul ia difuziuri procesis koeficientebis rekursiul i Sefasebis probl ema. Grobins-monros tipis stoqastur diferencial uri gantol ebebis amonaxsnTa asimptotur yofaqcevaze dayrdnobiT gamoyvanil ia rekursiul i Sefasebebis asimptoturi Tvissebebi [138].

pirobiT ganawil ebaTa da madiskontirebel i matricebis gadamrTvel i sasrul mdgomareobebiani SemTxveviti mimdevrobiT marTvadi pirobiT damoukidebel i SemTxveviti veqtorebis diskontirebul i j amebisaTvis dadgenil ia zRvariTi normal uroba, xolo kerZo SemTxvevaSi - miaxloebis siCqaris gerberis tipis Sefasebac [77].

mraval ganzomil ebiani puasonis funqcional ebi warmodgenil ia kompensirebul i puasonis procesiT stoqasturi integral is saxiT [87].

SemoRebul ia stoqasturi gawarmoebis operatoris axali ganmarTEba da Seswavl il ia misi Tvissebebi [146].

Seswavl il ia sadazRvevo kompaniebis sruli moTxovnebis ganawil ebis gaangariSebis probl ema. SemoTavazebul ia Sedgenil i ganawil ebebis daTvl is meTodi, romelic albaTobis mawarmoebel i funqciis rekurentul gaangariSebas eyrdnoba [150].

## Teoriul i fizikis ganyofil eba

**programa # 9:** kvanturi vel ebi Teoriasa da mis gamoyenebebTan dakavSirebul i maTematikuri amocanebis kvl eva el ementarul i nawil akebisa da kondensirebul i garemos fizikaSi

**programis koordinatori** \_ Teoriul i fizikis ganyofil ebiS gamge, ufrosi mecnier-TanamSromel i, fizika-maTematikis mecnier ebaTa doqtori merab el iaSvil i;

**programis Semsrul ebl ebi** \_ mTavari mecnier-TanamSromel i vaxtang garsevaniSvil i, ufrosi mecnier-TanamSromel i al eqsandre kviniXiZe, ufrosi mecnier-TanamSromel i giorgi Lavrel aSvil i, ufrosi mecnier-TanamSromel i giorgi ciciSvil i, ufrosi mecnier-TanamSromel i giorgi j orj aZe, mecnier-TanamSromel i badri maRraZe, mecnier-TanamSromel i avTandil SurRaia, mecnier-TanamSromel i arsen xvedel iZe, mecnier-TanamSromel i zaqro giunaSvil i.

ZiriTadi mecnierul i Sedegebis mokl e mimoxil va

**institutis programiT gaTval iswinebul i samuSaoebi**

### 1. koseturi $SL(2,R)$ WZNW model ebiS kvl eva

Seswavl il i iqna drois da sivrcis magvari minimal uri zedapirebi antidesiterul sivrcesi. nacvenebia, rom Tu sivrcis magvari zedapiri brtyel i da minimal uria, maSin is emTxveva kargad cnobil oTx-wveroian zedapirs. drois magvari zedapirebisaTvis miRebul i iqna yal iburad invariantul i gantol ebebi antidesiterul i sivrcis nebismieri ganzomil ebisaTvis. 5-ganzomil ebiani sivrcisTvis moZebnil i iqna brtyel i zedapirebis parametrizacia ori kiral uri vel iT.

Caketil i simis dinamika 3-ganzomil ebian minkovskis sivrcesi da  $SL(2,R)$  j gufur mraVal saxeobaze Seswavl il ia pol maieris sqemis fargl ebSi zedapirTa fundamental uri kvadratul i formeSis struqturebis gamoyenebiT. napovnia simis zedapirTa ori kl asi, romel Taganac erTi gaigivebul i iqna sinaTl is konusis yal ibis simebTan, xol o meore wvetian simebTan. am ukanasknel Ta asaRwerad gamoyenebul ia virasoros orbitebi, roml ebiC Seesabameba liuvil is Teoriis singul arul vel ebs monodromiis erTeul ovani matriciT.  $SL(2,R)$  sivrcesi aseve napovnia amoxsnaTa ori kl asi, romel Taganac erTi aRiwereba nul ovani kiral uri energiis mqone singul arul i liuvil is vel ebiT, xol o meore,  $SL(2,R)/U(1)$  ves-zumino vitenis model iT [25,45,17].

### 2. magnitur vel Si moTavsebul i grafenebis maTematikuri model ebiS kvl eva;

Sej amebul ia bol o 7-8 wl is ganmavl obaSi hol is kvanturi sistemebis kvl ebebis Sedegebi da gamoqveynebul ia mimoxil viTi naSromi [36]

gagrZel da muSaoba grafenul i sistemebis erTnawil akovan aRgznebaTa speqtris Sesaswavl ad. miRebul ia speqtris ganmsazRvrel i sekul arul i gantol ebis cxadi anal izuri forma.

### 3. geometriul i faza da ZiriTadi mdgomareobis struqtura

mi mdinareobda gamokvl evebi Zl ieri l azerul i vel is materiasTan urTierTqmedebis Seswavl is mimarTul ebiT. gaanal izebul ia damuxtul i spinis evol ucia intenziur el eqtromagnitur brtyel tal RaSi dipol uri miaxl oebis miRma [31,60]

invariantebis kl asikuri Teoriis farGl ebSi Seswavl ial ia binarul i sitemebis gadaxl arTvis maxasiaTebI ebi [40,116]

miRebul ia geometriul i fazis interpretacia rogorc grasmanis mraval nairobaze Stifel is  $U(N)$  fibraciis universal uri bmul obis hol onomiisa. nebismieri sawyisi mdgomareobisaTvis, es geometriul i faza gamoavl ens mdgomareobis evol uciis geometriul Tvissebs.

unitarul i gardaqmnis kartanis daSl is meTodi gamoyenebul ia or-kubitiani, birTvul i magnituri rezonansis kvanturi kompiuteriT real izebul i groveris al goriTmis SemTxvevaSi.

### 4. yal bi vakuumis DdaSl a gravitaciul model ebSi da tunel uri efeqtebi

miRebul ia moZraobis gantol ebebi skal arul i vel is TeoriaSi gravitaciasTan ara-minimal urad urTierTqmedebis SemTxvevaSi Txel kedl iani miaxl oebis daSvebis gareSe. gamoyvanil ia Sesabamisi sasazRvro pirobebi tunel irebis aRmwer amoxsnisaTvis.

gagrZel da kvl eva ramdenime skal arul i vel is TeoriaSi kvanturi gaJonvis procesebsa da Termul i aqtivaciis kl asikur procesebs Soris fazuri gadasvl ebis Seswavl is mizniT. ori da sami skal rul i vel is SemTxvevaSi napovnia vel ebis periodul i konfiguraciebis garkveul i kl asi erT-ganzomil ebian kompaqtur sivrceSi da naCvenebia, rom fl uqtuaciebis gantol ebebs aqvT erTi uaryofiTi sakuTari mniSvnel oba, rac periodul i amoxsnebis aramdgradobaze mi uTi Tebs.

### 5. kvanturi qromodinamikisa da rel ativisturi birTvul i fizikis gantol ebebis kvl eva

vantur qromodinamikaSi axal i meTodiT gamokvl eul i iqna tau-l eptonis inkl uziuri Hhadronul i daSl is procesi ara-ucnaur nawil akebad veqtorul arxSi. Hhadronul i speqtral uri funqcia aproqsimirebul i iqna SeSfoTebis TeoriaSi energiis kvadratis sakmarisad didi mniSvnel obebze ( $S > S_{PT} > 0$ ) sadac  $S_{PT}$  aRniSnavs energiis kvadratis sasazRvro mniSvnel obas roml is zemoT SeSfoTebis Teoriis gamoyeneba SesaZl ebel ia. energiis dabal

mniSvnel obebze, sazRvris qvemoT, speqtral uri funqciisaTvis gamoyenebul i iqna ALEPH kol aboraciis gazomvis Sedegebi.

Sesabamisi adl eris funqciis gamosaTvl el ad gamoyenebul i iqna konturiT gaumj obesebul i SeSfoTebis Teoria (CIPT). gamoyvanil i iqna transcendental uri gantol ebebis sistema kvanturi gromodinamikis fundamental uri skal is  $\Lambda$  da  $S_{PT}$  parametrebisaTvis.G gantol ebaTa sistema amoixsnil i iqna ricxviTi meTodiT. adl eris funqciisaTvis gamoyenebul i iqna TanmimdevrobiTi miaxl oebebi: NLO, NNLO, NNNLO, NNNNLO. garda amisa gamoyenebul i iqna meoTxe rigis efeqturi bmis mudmivi. demonstrirebul i iqna rom miRebul i ricxviTi Sedegebi axal proceduraSi bevrad ufro stabil uria maRal i rigis Sesworebebis mimarT vidre standartul i proceduriT miRebul i Sesabamisi Sedegebi.

gansakuTrebul i yuradReba daeTmo am parametrebis eqsperimentali uri ganusazRvrel obebis Sefasebas. am mizniT gamoyenebul i iqna kol aboraciis monacemebi masis kvadratis ganawil ebebze. Zl ieri urTierTmoqmedebis mudmivis central uri mniSvnel obisaTvis (tau-leptonis masis skal aze) Cveni procedura winaswarmetyvel obs ufro dabal mniSvnel obas vidre standartul i CIPT procedura. amitom warmodgenil i Sefaseba aumj obesebs Tavsebadobas sxva eqsperimentebidan miRebul SefasebebTan bmis konstantisaTvis. garda amisa gamoTvl il i iqna e.w. "eqsperimental uri" adl eris funqcia da Sedgenil i iqna ricxviTi cxril i misi mniSvnel obebisaTvis infrawitel areSi. gamoTvl il i iqna eqsperimental uri ganusazRvrel obebi am funqciisaTvis kol aboraciis monacemebis gamoyenebiT.

mimdinareobda muSaoba relativistur birTvul fizikaSi. KkerZod, muSavdeboda kriteriumebi central uri da aracentral uri urTierTqmedebebis gansacal ebl ad. EerTerTi, yvel aze mniSvnel ovani kriteriumi mdgomareobs imaSi, rom central urad iTvl eba iseTi SemTxvevebi, sadac birTv-birTvul daj axebaSi sabol oo mdgomareobaSi ar aris arcerTi stripingul i da speqtatorul i protoni, anu iseTi protoni, romel sac ar miURia monawil eoba urTierTqmedebaSi. amAmosazrebebis Sesamowmebl ad magal iTisTvis aRebul i iyo naxSirbad-tantal is daj axebebi, roml ebic registrirebul i iyo dubnis birTvul i kvlebebis gaertianebul i innstitutis ormetrian propanis kameraSi. sawyisi birTvis energia iyo 4.2 gev/nukl onze. Teoriul i mosazrebebis Tanaxmad ase dayofil central ur da aracentral ur SemTxvevebSi arsebitad unda gansxvavdebodnen meoradi protonebisa da pi mezonebis maxasiaTebl ebi, kerZod ganawil ebebi mravl obitobebis mixedviT, impul suri da kuTxuri ganawil ebebi da a.S. eqsperimentul i monacemebis anal izma gviCvena, rom es marTI ac asea.

## 6. birTvul i materiis temperaturis damokidebul ebis Seswavi a.

gamokvl eul ia materiis Tvisebebs sasrul simkvriveebze da temperaturebze. ganxil ul iqna kvarkul i materia feradi zegamtareobis fazaSi. aseve gamoviTvl il ia mkvrivi varskvl avis



fazuri struqtura, mdgomareobis gantol eba da radiusis masaze damokidebul eba [37]

### sagranto proeqtebi T gaTval iswinebul i samuSaoebi

Seswavi ilia meqanikuri sistema, romelic  $SL(2,R)/U(1)$  koseturi modelis vakuumur seqtors arwers. es sistema dayvanili iqna centraluri simetriis vel Si moZrav gravitaciuli nailakis dinamikaze. kuTxuri momentis gafaqtorebi T miRebuli iqna erTganzomilebiani modeli morsis magvari potencialiT. Aam modelisaTvis Seswavi ilia iqna gabnevisa da bmul mdgomareobebis amocanebi, rogorc kl asikur aseve kvantur doneze.

polmaieris reduqciis sqemis gamoyebebi T, agebuli iqna axali klasi simis Teoriis amoxsnevisa AdS x S sivrceebSi. simis zedapirTa proeqciebi calke AdS sivrceSi da calke sferoze zogadad ar aris minimaluri, Tumca zedapiri rogorc mTliani AdS x S sivrceSi minimaluria.

Seswavi ilia  $SU(2)$ -yal iburi velis Teoria 4-ganzomilebian evklidur sivrceSi 4-ganzomilebian sferul zedapirze. napovnia perioduli instantoni, romelic axorcielbs fazur gadasvl ebs kvantur da kl asikur procesebs Soris. momzadebulia xel naweri samecniero Jurnal Si gamosaqveynebl ad.

kvantur qromodinamikaSi gamokvl euli iqna tau-leptonis hadronuli dasla ara-ucnaur nawilakebad veqtorul arxSi. gamoyenebuli iqna axali metodi romelic ar iyenebs vilsonis operatorul gaslas da amitom SesaZlebi obas gvaZlevs Semowmdes kvark-hadronuli dualobis hipoteza. nacvenebi iqna rom gamoTvlebis standartul sqemebSi kvark-hadronuli dualobis darRveva SeiZleba iyos sakmarisad didi da amitom es efeqti gaTval iswinebuli unda iqnas Zlieri urTierTmoqmedebis konstantis ricxviti mniSvnelobis dadgenisas. dualobis darRvevis efeqti adidebs am konstantis WeSmarit ricxviti mniSvnelobas. Seswavi ilia elementarul argznebebis zogierTi sakiTxi Tanazomvad da araTanazomvad fazebSi. agebulia Sesabamisi mikroskopuli mdgomareobebi sadac cxadad cans argznebebis meronuli struqtura.

nawil obriv gamoTvili iqna CMB is bispeqtrumSi kosmologiuri magnituri velis veqtoruli modit gamowveuli wvili.

efeqturi velis TeoriaSi ar dgenilia yal iburi invariantoba, miuxedavad imisa rom gantol ebebSi impul sebi CamoWvilia garkveul skalaze.

## **Tavi 4. Catarebul i samecniero konferenciebi**

### **institutis mier an Tanamonawil eobiT Catarebul i konferenciebi**

saerTaSoriso skol a-konferencia New trends in geometry and topology, 23-31 agvisto, baTumi.

saerTaSoriso konferencia Eighth International Tbilisi Symposium on Language, Logic and Computation, bakuriani, 21-25 seqtemberi.

saqarTvel os maTematikosTa me-5 yril oba, 9-11 oqtomberi, baTumi, quTaisi.

akad. n. berikaSvil is 80 wl istavisadmi miZRvnil i andria raz-maZis maTematikis institutis samecniero konferencia, 2-6 noemberi, Tbilisi.

moxsenebaTa CamonaTval i ix. danarTSi.

## **Tavi 5. gamoqveynebul i da gamosaqveynebl ad gadacemul i naSromebi**

2009 wel s gamoqveynda institutis TanamSromel Ta 92 naSromi, maT Soris: 4 monografia. 67 naSromi gamoqveynebul ia ucxour da 25 qarTul gamocemebSi. 37 naSromi gamoqveynda impaqt-faqtoris mqone gamocemebSi. gamosaqveynebl ad gadaeca 62 naSromi (ix. danarTi 1).

## **Tavi 6. sazRvargareT da saqarTvel oSi gamarTul samecniero forumbze wakiTxul i moxsenebebi**

2009 wel s institutis TanamSroml ebma gaakeTes 36 moxseneba sazRvargareT gamarTul samecniero konferenciebze da 57 moxseneba saqarTvel oSi gamarTul konferenciebze (ix. danarTi 2).

## Tavi 7. saerTaSoriso samecniero TanamSroml oba

1. **m. bakuraZe** mi vl ine bul i iyo parizSi paris-13 universitetSi INTAS-is grantiT gaTval iswinebul i samecniero muSaobis Sesasrul ebl ad da seminarebSi monawil eobis misaRebad 2009 wl is 21 martidan 28 martamde.
2. **n. beJaniSvil i** mi vl ine bul i iyo: l ondonis samefo kol ej Si (didi britaneTi) informatikis departamentis asocierebul mkvl evarad 2009 wl is 27 april idan 1 agvistomde; q. amsterdamSi (hol andia) TACL-2009 konferenciaSi monawil eobis misaRebad 2009 wl is 6-dan 21 ivl isamde; l ondonis saimperio kol ej Si (didi britaneTi) proeqtze "Order-topological and model- theoretic methods in modal logic" samuSaod 2009 wl is 26 agvistodan 25 dekembramde.
3. **d. gabel aia** mi vl ine bul i iyo q. izmirSi (TurqeTi) saerTaSoriso saZamTro skol aze l eqciaTa kursis "Topological Semantics of Modal Logic" wasakiTxad 2009 wl is 14-18 dekembers.
4. **v. garsevaniSvil i** mi vl ine bul i iyo JenevaSi (Sveicaria) evropis birTvul i kvl evis centrSi saerTo samuSaoebis Casatarebl ad 2009 wl is 1 ivnidan 31 ivl isamde.
5. **T. daTuaSvil i** mi vl ine bul i iyo santiago de kompostel as universitetSi (espaneTi) 2009 wl is 10 maisidan 11 ivl isamde, xol o 11 ivl isidan 31 ivl isamde kaizeris universitetSi (TurqeTi) erTobl ivi samecniero muSaobis Casatarebl ad.
6. **g. donaZe** mi vl ine bul i iyo santiago de kompostel as universitetSi (espaneTi) samecniero TanamSroml obisaTvis 2009 wl is 10 seqtembridan 2010 wl is 20 ivnisamde.
7. **r. duduCava** mi vl ine bul i iyo q. guanajuatos universitetSi (meqsika) saerTaSoriso kinferenciaSi IWOTA 2008 monawil eobis misaRebad 2009 wl is 18-dan 25 seqtembramde; orl andoSi, boka ratonSi fl oridis atl antikur universitetSi (aSS) saerTaSoriso konferencia ASME 2009 (American Society of Mechanical Engineering)-ze moxsenebis gasakeTeb l ad da erTobl ivi mecnierul i muSaobisaTvis 2009 wl is 14-dan 25 noembramde. r. duduCava 26 seqtembridan 4 oqtombramde imyofeboda mi vl ine biT portugal iaSi l isabonis teqnukur universitetSi da aveiros universitetSi. vizitis fargl ebSi gamovida moxsenebebi T: semi nar ze: "Analysis", University of Aveiro, Portugal moxseneba: "Uniqueness of a solution to Maxwell's system", semi nar ze "Functional Analysis and Applications", Instituto Superior Technico, Lisboa, Portual moxseneba: "Equivalent regularization of Maxwell's system". r. duduCava iyo Tanaredaqtori prof. n. vasil evskisadmi miZRvnil i konferenciis kreb l isa Operator Theory: Advances and Applications. Basel. rogorc redkol egiis wevri,

TanamSroml obda ucxour samecniero Jurnal Tan “*Integral Equations and Operator Theory*”. rogorc redkol egiis wevri TanamSroml obs samecniero Jurnal ebTan “*Georgian Mathematical Journal*” ”Memoirs on Differential Equations and Mathematical Physics”. rogorc recenzenti TanamSroml obda Jurnal ebTan: “Journal of Mathematical Analysis and Applications”, “Mathematical Methods in Applied Sciences”, “Complex Variables and Elliptic Equations”, “Archive for Rational Mechanics and Analysis”, “ Functional Analysis and Applications“. 1990 wl idan aris referatul i Jurnal is “*Mathematical Reviews*” referenti, xol o 1985 wl idan aris referatul i Jurnal is “*Zentralblatt MATH*” referenti.

8. **a. el aSvil i** mi vl inebul i iyo boxumis universitetSi (germania) erTobl ivi samecniero samuSaoebisaTvis da konferenciaSi monawil eobis misaRebad 2009 wl is 2 Tebervl idan 2 maisamde. a. el aSvil i 2009 wl is 4 ivnisidan 4 seqtembramde mi vl inebul iyo erTobl ivi samuSaoebisaTvis da konferenciebSi monawil eobis misaRebad: maqs pl ankis institutSi (boni); bil efel dis universitetSi (germania); praRis maTematikis institutSi (CexeTi); kembrij is niutonis institutSi (didi britaneTi); I ozanis unive-rsitetSi (Sveicaria); bremenis universitetSi (germania). a. el aSvil i mi vl inebul i iyo q. rehovotis vaicmanis institutSi (israel i) erTobl ivi kvl evebis Casatarebl ad 2009 wl is 6-27 dekembers. a. el aSvl ma moamzada erTobl ivi statiebi maTematikosebTan V.Kac (MIT-USA), E.Vinberg (MGU-Russia), De Graf (Trento-UNI Italy).
9. **m. el iaSvil i** mi vl inebul i iyo q. ericeSi (ital ia) mecnierTa msoufl io federaciis seminarSi monawil eobis misaRebad 2009 wl is 16-26 agvistos; anesis (safrangeTi) Teoriul i fizikis l aboratoriaSi erTobl ivi samecniero kvl evebis Casatarebl ad 2009 wl is 1 noembridan 1 dekembramde.
10. **n. inasariZe** mi vl inebul i iyo: santiago de kompostel as universitetSi (espaneTi) saerTo samecniero proeqtze samuSaod 2009 wl is 25 Tebervl idan 5 april amde da 27 maisidan 20 ivnisamde; vigos universitetSi (espaneTi) 2009 wl is 15 seqtembridan 2010 wl is 1 ianvramde erTobl ivi grantis fargl ebSi samecniero kvl evis gansaxorciel ebl ad.
11. **x. inasariZe** aris fol ksvagenis fondis grantis (Georgian-German Non-Commutative Algebra-Geometry-Topology Partnership, 2009-2011) Tanaxel mZRvanel i. aris ori saerTaSoriso mniSvnel obis el eqtronul i maTematikuri Jurnal is “Journal of Homotopy and Related Structures” da “Tbilisi Mathematical Journal” mTavari redaqtori, romel Ta beWvdiTi versiebis dabeWdva daiwyo 2009 wl idan “College Publications, University of London”- is mi er.
12. **a. kvinixiZe** mi vl inebul i iyo: q. dubnaSi (ruseTi) birTvul i

kvl evis gaerTianebul institutSi erTobl ivi kvl eviT samuSaoebis Casatarebl ad 2009 wl is 27 maisidan 12 ivnisamde; q. kievSi (ukraina) 2009 wl is 13 seqtembridan 19 seqtembramde, xol o 20 seqtembridan 30 seqtembramde q. pekinSi (CineTi) samecniero konferenciebSi monawil eobis misaRebad. a. kvinixiZe TanamSroml obda avstral iis, germaniis da iaponiis fizikosebTan, man gamoaqveyna maTTan TanaavtorobiT Sromebi.

13. **i. kiRuraZe** mi v l i n e b u l i i y o : f l o r i d i s t e q n o l o g i u r i i n s t i t u t i s m a T e m a t i k u r m e c n i e r e b a T a d e p a r t a m e n t S i ( m e l b u r n i , a S S ) e r T o b l i v i k v l e v e b i s C a s a t a r e b l a d s a s a z R v r o a m o c a n a T a T e o r i a S i d a a m a v e d e p a r t a m e n t i s s e m i n a r e b S i m o n a w i l e o b i s m i s a R e b a d 2 0 0 9 w l i s 1 T e b e r v l i d a n 1 7 a p r i l a m d e d a 2 0 0 9 w l i s 1 5 d e k e m b r i d a n 2 0 1 0 w l i s 1 m a r t a m d e ; q . o d e s i s u n i v e r s i t e t S i ( u k r a i n a ) s a k a n d i d a t o d i s e r t a c i e b i s o f i c i a l u r o p o n e n t a d 2 0 0 9 w l i s 2 4 i v n i s i d a n 2 i v l i s a m d e d a 2 - d a n 7 d e k e m b r a m d e . i v a n e k i R u r a Z e r o g o r c r e d k o l e g i i s w e v r i T a n a m S r o m l o b d a u c x o u r s a m e c n i e r o J u r n a l e b T a n : “ *Boundary Value Problems* ” ; “ *Electronic Journal of Qualitative Theory of Differential Equations* ” ; “ *Nonlinear Oscillations* ” ; “ *Fasciculi Mathematici* ” ; “ *Functional Differential Equations* ” ; “ *Journal of Applied Mathematics, Statistics and Informatics* ” , x o l o r o g o r c r e c e n z e n t i \_ J u r n a l e b T a n : “ *Дифференциальные уравнения* ” , “ *Nonlinear Analysis* ” , “ *Mathematische Nachrichten* ” , “ *Mathematical and Computer Modeling* ” .
14. **v. kokiI aSvil i** mi v l i n e b u l i i y o : S v e d e T S i m i t t a g - l e f l e r i s i n s t i t u t S i , l u l e a s t e q n o l o g i e b i s u n i v e r s i t e t i s m i e r o r g a n i z e b u l s a e r T a S o r i s o k o n f e r e n c i i s m u S a o b a S i d a s a d i s e r t a c i o d a c v i s J i u r i s w e v r o b a S i m o n a w i l e o b i s m i s a R e b a d 2 0 0 9 w l i s 7 i v n i s i d a n 1 4 i v n i s a m d e ; l o n d o n S i s a i m p e r i o k o l e j S i ( d i d i b r i t a n e T i ) I S A A C - i s k o n g r e s S i m o n a w i l e o b i s m i s a R e b a d 2 0 0 9 w l i s 1 3 i v l i s i d a n 1 8 i v l i s a m d e .
15. **g. I avrel aSvil i** mi v l i n e b u l i i y o m a q s p l a n k i s g r a v i t a c i u l i f i z i k i s i n s t i t u t S i ( g o l m i , g e r m a n i a ) 2 0 0 9 w l i s 1 T e b e r v l i d a n 3 i v n i s a m d e d a 2 a g v i s t o d a n 1 d e k e m b r a m d e , s a d a c e v r o p e l k o l e g e b T a n e r T a d m u S a o b d a s a e r T o s a m e c n i e r o i n t e r e s i s m q o n e s a k i T x e b z e . 2 0 0 9 w l i s 3 i v n i s i d a n 1 a g v i s t o m d e i m y o f e b o d a s a m e c n i e r o v i z i t i T a b d u s s a l a m i s T e o r i u l i f i z i k i s s a e r T a S o r i s o c e n t r S i ( t r i e s t i , i t a l i a ) s a d a c s a m e c n i e r o k v l e v i s g a r d a m o n a w i l e o b a m i R o o r s a e r T a S o r i s o k o n f e r e n c i a S i .
16. **v. I omaZe** mi v l i n e b u l i i y o q . l a h o r e s a b d u s s a l a m i s m a T e m a t i k u r s k o l a S i ( P p a k i s t a n i ) 2 0 0 9 w l i s 2 8 s e q t e m b r i d a n 2 1 d e k e m b r a m d e l e q c i e b i s c i k l i s w a s a k i T x a d .
17. **m. mania** e r T o b l i v i s a m e c n i e r o k v l e v e b i s a T v i s m i w v e u l i i y o e v r i s u n i v e r s i t e t S i ( p a r i z i ) d a c i u r i x i s u n i v e r s i t e t S i 2 0 0 9 w l i s 4 s e q t e m b e r i d a n 4 o q t o m b r a m d e . g a m o v i d a m o x s e n e b e b i T : U t i l i t y m a x i m i z a t i o n a n d h e d g i n g u n d e r p a r t i a l I n f o r m a t i o n , S e m i n a r o n f i n a n c i a l

mathematics, University EVRY. An exponential martingale equation, Seminar on Stochastic Analysis, Ecole Polytechnique, Paris. Mean-Variance Hedging with a quasi-continuous Process and Related BSDEs, ETH Zurich.

18. **b. mesabl iSvil i** mi vl inebul i iyo diusel dorfis universitetSi (germania) samecniero kvl eviT i saqmianobisaTvis 2009 wl is 15 seqtembridan 15 dekembramde.
19. **a. mesxi** mi vl inebul i iyo paduas universitetSi (ital ia) l eqciebis kursis wasakiTxad da samecniero saqmianobis gasagrZel ebl ad 2009 wl is 15 april idan 15 ivnisamde.
20. **s. muxigul aSvil i** mi vl inebul i iyo CexeTis mecnierebaTa akademiis maTematikis institutis brnos filial Si erTobl ivi kvl evebis Casatarebl ad 2009 wl is 1 dekembridan 2010 wl is 27 Tebevrl amde.
21. **d. pataraia** mi vl inebul i iyo q. l as krucesSi (aSS) niu-meqsikis saxel mwifo universitetSi BLAST-2009 konferenciaSi monawil eobis misaRebad 2009 wl is 10-26 agvistos.
22. **s. sanebl iZe** monawil eobda erTobl iv kvl evaSi ronald ambl Tan (aSS, pensil vaniis universiteti) erTad. momzadda erTobl ivi naromi.
23. **n. farcvania** rogorc recenzenti, TanamSroml obda saerTaSoriso Jurnal ebTan "*Boundary Value Problems*", "*Electronic Journal of Qualitative Theory of Differential Equations*", "*Mathematica Bohemica*", "*Archivum Mathematicum*", "*Computers & Mathematics with Applications*", "*Дифференциальные Уравнения*". aris referatul i Jurnal is "*Mathematical Reviews*" referenti. masarikis universitetis profesor b. puJasTan erTad, romelic institutSi samecniero mi vl inebiT imyofeboda 2009 wl is 10 agvistodan 10 seqtembramde, nino farcvaniam Caatara kvl evebi sasazRvro amocanaTa TeoriaSi da gamosaqveynebl ad gadasca ori samecniero naSromi.
24. **T. qadeiSvil i** mi vl inebul i iyo triestSi (ital ia) Teoriul i fizikis saerTaSoriso centrSi 2009 wl is 14 ivnisidan 14 ivl isamde, sadac igi muSaobda rogorc ufrosi asociirebul i wevri. T. qadeiSvil i agreTve monawil eobda erTobl iv kvl evaSi tom l adasTan (aSS, Crdil o karol inis universiteti) erTad. momzadda erTobl ivi naromi.
25. **g. ciciSvil i** mi vl inebul i iyo Teoriul i fizikis centrSi (ital ia) samecniero kvl eviT i saqmianobis mizniT 2009 wl is 2 martidan 31 maisamde. g. ciciSvil i hol is kvanturi sistemebis kvl evisas TanamSroml obda tuhokus univesitetTan (iaponia).
26. **s. xaribegaSvil i** rogorc recenzenti TanamSroml obda ucxour

samecniero Jurnal ebTan “*E. J. Qualitative Theory of Differential Equations*” da “*J. Nonlinear Analysis: Theory, Methods & Applications*”.

27. **a. xvedel iZe** mi v l i nebul i iyo dubnis birTvul i kv l evis gaerTiane bul institutSi (ruseTi) 2009 wl is 15 martidan 17 ivl isamde da 2009 wl is 26 noembridan 2010 wl is 1 april amde.
28. **g. ximSiaSvil i** mi v l i nebul i iyo: q. kievis maTematikis institutSi (ukraina) saerTo kv l evebis Casatarebl ad 2009 wl is 20 ianvridan 20 Tebervl amde; q. utrextSi (hol andia) saerTo gamokvl evebis Casatarebl ad 14 Tebervl idan 2 martamde; q. triestSi (ital ia), q. bonSi (germania) da q. l ondonSi (didi britaneTi) saerTo kv l evebis Casatarebl ad, 10 maisidan 20 ivl isamde; sankt-peterburgSi (ruseTi) da obervol faxSi (germania) 19 oqto-mbridan 30 noembramde simpoziumSi monawil eobis misaRebad da saerTo gamokvl evebis Casatarebl ad. g. ximSiaSvil ma noemberSi mi iRo monawil eoba obervol faxis institutis samkvirian programaSi “Research in Pairs” (with G.Barsegyan and H.Begehr). mi Rebul i Sedegebi wardgenil ia angariSis saxiT da mi Rebul ia gamosaqveynebl ad obervol faxis preprintebis seriaSi.
29. **e. xmal aZe** mi v l i nebul i iyo santiago de kompostel as universitetSi (espaneTi) samecniero kv l eviT i saqmianobisaTvis 2009 wl is 2 seqtembridan 20 oqtombramde.
30. **m. j ibl aZe** mi v l i nebul i iyo q. l as krucesSi (aSS) niu-meqsikis saxel mwifo universitetSi BLAST-2009 konferenciaSi monawil eobis misaRebad 2009 wl is 10-26 agvistos.
31. **g. j orj aZe** mi v l i nebul i iyo berl inis humbol tis universitetSi (germania) 2009 wl is 1 ianvridan 1 oqtombramde da 2009 wl is 19 oqtombridan 2010 wl is 1 ianvramde, sadac TanamSroml obda germanel kol egebTan. Mmis mier humbol tis universitetis fizikis fakul tetze wakiTxul i iqna ori l eqcia-seminari. rogorc recenzenti, TanamSroml obda saerTaSoriso Jurnal ebTan “*Journal of Physics A*”, “*Journal of High Energy Physics (JHEP)*”.

**al baTobis Teoriisa da matematikuri statistikis** ganyofil ebis wevrebi TanamSroml obdnen rogorc recenzentebi samecniero Jurnal ebTan: Stochastic Processes and their Applications, SIAM Journal on Control and Optimization, Finance and Stochastics, Mathematical Finance, Transactions on Automatic Control.

## Tavi 8. sagamomceml o saqmi anoba

2009 wel s gamovi da:

Jurnal is "*a. razmaZis maTematikis institutis Sromebi*" sami tomi: 149, 150 da 151;

"*saqarTvel os maTematikuri Jurnal is*" me-16 tomis oTxi nomeri;

Jurnal is „*memuarebi diferencial ur gantol ebebsa da maTematikur fizikaSi*“ sami tomi: 46, 47, 48.

## Tavi 9. damatebiTi informacia

a. xaraziSvil i da a. kvinixiZe 2009 wel s airCies saqarTvel os mecnierebaTa erovnul i akademiis wevr-korespondentebad.



2009 weli s gamoqveynebul i da gamosaqveynebl ad gadacemul i  
naSr omebi

2009 weli s gamoqveynebul i samecniero naSr omebi

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133. **V. Kokilashvili**, The Riemann boundary value problem for analytic functions in the frame of grand  $L^p$  spaces. *Bull. Georgian Nat. Acad. Sci.* (accepted).
134. \***V. Kokilashvili** and **V. Paataashvili**, Generalization of I. Vekua's integral representations of holomorphic functions and their application to the Riemann-Hilbert-Poincaré problem. *Function Spaces and Application* (accepted).
135. V. Kolesov and **L. Shapakidze**, Instabilities and transition in flows between two porous concentric cylinders with radial flow and radial temperature gradient. *Phys Fluids.* (to appear).
136. **S. Kukujanov**, On the stability of orthotropic cylindrical shells. *Izvestia Ros. Akad. Nauk, MTT.* (submitted).
137. **N. Lazrieva** and **T. Toronjadze**, The Robbins–Monro type stochastic differential equation III. Polyak's averaging. *Stochastics: An International Journal of Probability and Stochastic Processes* (accepted).
138. **N. Lazrieva** and **T. Toronjadze**, Recursive parameter estimation in the trend coefficient of a diffusion process. *Georgian Math. J.* (submitted).
139. **M. Mania** and R. Tevzadze, Backward stochastic PDEs related to utility maximization and hedging. *J. Appl. Probab.* (submitted)
140. **B. Mesabliashvili** and R. Wisbauer, Bimonads and Hopf monads on categories. *J. K-theory* (submitted).
141. **B. Mesabliashvili** and R. Wisbauer, Galois functors and entwining structures. *Preprint* 2009, arXiv: [arXiv:0909.5590](https://arxiv.org/abs/0909.5590), submitted to *J. Algebra*.
142. **B. Mesabliashvili** and R. Wisbauer, On rational functors. *Comm. Algebra* (submitted).
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144. **V. Paataashvili**, On the Haseman boundary value problem in classes of functions representable by the Cauchy type integrals with density from weighted variable exponent Lebesgue spaces. *Mem. Differential Equations Math. Phys.* (accepted).
145. **N. Partsvania** and B. Půža, A resonance periodic problem for differential equations with deviating arguments. (Russian) *Differentsial'nye Uravneniya* (accepted).
146. **O. Purtukhia**, A new approach to the definition of stochastic derivative operator of Poisson functionals. *Theory Stoch. Processes* (to appear).
147. G. Samsonadze and **D. Zangurashvili**, Amalgamated free products of topological groups—a new approach. *Appl. Categ. Structures* (submitted).
148. **L. Shapakidze**, The effect of the temperature gradient on the stability of flow between two permeable cylinders. *Rep. Enlarged Sess. Semin. I. Vekua Inst. Appl. Math.* (to appear).
149. **T. Shervashidze**, Limit theorems for discounted sums of random vectors with variable discounting matrix. *Bull. TICMI* (submitted).
150. **T. Toronjadze**, **Z. Tsigroshvili**, G. Chincharauli, M. Makharadze, General Panjer's type recursion. *Georgian Math. J.* (submitted).
151. **А. Р. Цицкишвили**, З. А. Цицкишвили, Р. А. Цицкишвили, Решение двумерной задачи теории установившейся фильтрации через земляную



плотину с верхним ломаным откосом. saqarTvel os sapatriarqos wmindanda andria pirvel wodebul is saxel obis qarTul i universitetis saerTaSoriso el eqtronul i Jurnal i `maTematika, meqanika" (gadacemul ia gamosaqveynebl ad).

152. **А. Р. Цицкишвили**, Н. П. Джорбенадзе, З.А. Цицкишвили, Р.А. Цицкишвили, Решение задачи теории фильтрации через земляную перемычку имеющую трапецеидальную форму и задачи о притоке грунтовых вод к дренажной канаве треугольной формы с подпором. saqarTvel os sapatriarqos wmindanda andria pirvel wodebul is saxel obis qarTul i universitetis saerTaSoriso el eqtronul i Jurnal i `maTematika, meqanika" (gadacemul ia gamosaqveynebl ad).
153. **А. Р. Цицкишвили**, З.А. Цицкишвили, Р.А. Цицкишвили, Стационарные течения жидкости между двумя несоосными проницаемыми (непроницаемыми) цилиндрическими поверхностями. saqarTvel os sapatriarqos wmindanda andria pirvel wodebul is saxel obis qarTul i universitetis saerTaSoriso el eqtronul i Jurnal i `maTematika, meqanika" (gadacemul ia gamosaqveynebl ad).
154. **D. Zangurashvili**, Effective codescent morphisms in some varieties of universal algebras. *Appl. Categ. Structures* (submitted).

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samecniero forumbze wakiTxul i moxsenebebi

saerTaSoriso konferenciebze wakiTxul i moxsenebebi

v. kokiI aSvili, orwoniani Sefasebebis probl ema harmoniul i anal izis operatorebisatvis (pl enarul i moxseneba), "anal izis utol obebi da homogenizaciis Teoria", 7-14 ivnisi (2009), I ul eo (SvedeTi)

v. kokiI aSvili, arawrfivi harmoniul i anal izis operatorTa woniani normebis Sefasebebis kriteriუმები da gamoyenebebi harmoniul i funqciebis sasazRvro amocanebSi rTul i geometriul i bunebis sazRvrian areebSi (pl enarul i moxseneba), "ISAAC-is me-7 kongresi", 13-18 ivl isi (2009), I ondoni (didi britaneTi)

a. kirTaze, sigma-sasrul i invariantul i zomebis erTaderTobis Sesaxeb, "stohasturi anal izi da SemTxveviTi dinamika", 14-20 ivnisi (2009), I vovi (ukraina)

a. kirTaze, funqciis zomadobis simravl ur-Teoriul i aspeqtebi, ukrainis maTematikuri kongresi, (2009), kievi (ukraina), <http://www.imath.kiev.ua/~congress2009/>

a. kirTaze, el ementarul geometriaSi arael ementarul i meTodebis Sesaxeb, "saerTaSoriso konferencia geometriasa da mis gamoyenebebsi", 5-10 seqtemberi (2009), varna (bul gareTi)

a. xaraziSvili, araTvl ad j gufebze sigma-sasrul i araseparabel uri invariantul i zomebis arsebobis Sesaxeb, "stohasturi anal izi da SemTxveviTi dinamika", 14-20 ivnisi (2009), I vovi (ukraina)

a. xaraziSvili, uwyveti total urad aramonotonuri funqciebis Sesaxeb, "ukrainis maTematikuri kongresi", (2009), kievi (ukraina)

a. xaraziSvili, el ementarul geometriaSi arael ementarul i meTodebis Sesaxeb, "saerTaSoriso konferencia geometriasa da mis gamoyenebebsi", 5-10 seqtemberi (2009), varna (bul gareTi)

j . gvazava, On the quiet Gaps within domains of propagation on non-linear waves. *Abstracts of the International Conference "Modern Problems of Computational Mathematics and Mathematical Physics" Dedicated to the Memory of Academician A. A. Samarsky, Moscow, 2009.*

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**r. duduchava, T. buCukuri, o. Wkadua, d. natroSvil i**, Cracks Problems in Composites with Piezoelectric and Thermal Effects” *ASME International 2009, Mechanical Engineering Congress & Exposition IMECE, November 14-21, 2009, Florida, USA,*

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**T. Buchukuri, O. Chkadua , R. Duduchava, and D. Natroshvili**. Interface Cracks Problems in Composites with Piezoelectric and Thermal Effects. *International 2009, Mechanical Engineering Congress & Exposition IMECE, November 14-21, 2009, Florida, USA,*

**I . SafaqiZe**, Instability and transition in flows between two porous concentric cylinders with radial flow and radial temperature gradient (with V. Kolesov). Third International symposium on Instabilities and Bifurcation in Fluid Dynamics, 10-13 August, 2009, Nottingham..

**d. zanguraSvil i**, konferencia International Matematica User conference, Champaign (Illinois, USA), October 22-24, 2009, მოხსენება Term-rewriting systems and descent in some categories”.

**T. daTuaSvil i**, მოხსენებები სემინარებზე პონტევედრასა და სანტიაგოს დე კომპოსტელას (ესპანეთი) უნივერსიტეტებში, მათემატიკის განყოფილების სტუმარი (თურქეთი) უნივერსიტეტში. გაატარა სასაუბრო და ერთობლივი კვლევითი ხასიათის 12 სემინარი უნივერსიტეტში.

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Knot theory and its applications, May 2009, ICTP, Trieste, Italy, მოხსენება “Holomorphic dynamics of knots”  
6<sup>th</sup> ISAAC Congress, June 2009, Imperial College, London, მოხსენება “Riemann-Hilbert problems in loop spaces” ნაწილობრივად კონფერენციის კრებულში გამოსაყვეთად

Circle packings, August 2009, Bergakademie, Freiberg, Germany, moxseneba  
“Configuration spaces as intersections of quadrics”  
New trends in geometry and topology, September 2009, Batumi University, Batumi,  
moxseneba “Cyclic configurations of polygonal linkages”

**d. pataraia, m. j ibl aze**, konferenci a TbiLLC 2009 , moxseneba A new proof  
of total disconnectedness for compact Hausdorff boolean algebras.

**l . esakia**, konferenci a TACL’09, moxseneba Fatal Heyting Algebras and  
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**n. beJani Svil i, g. beJani Svil i**, An algebraic approach to canonical formulas:  
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**l . esakia**, konferenci a BLAST’09, moxseneba On simultaneously reflective and  
coreflective categories of Heyting algebras, <http://subsessile.nmsu.edu/blast/BLASTAbstracts2009.pdf>

**m. j ibl aze, d. pataraia**, konferenci a BLAST’09, moxseneba An “Elementary”  
Treatment of Compact Hausdorff Boolean Algebras.

**ნ. ბეჟანიშვილი, ლ. ესაკია**, konferenci a TACL’09 - <http://www.illc.uva.nl/tac109/>

**ლ. ესაკია, მ. ჯიბლაძე, დ. პატარაია**, konferenci a BLAST’09 - <http://subsessile.nmsu.edu/blast/>

**ლ. ესაკია, მ. ჯიბლაძე, დ. პატარაია, დ. გაბელაია, ნ. ბეჟანიშვილი**, konferenci a  
TbiLLC’09 - <http://www.illc.uva.nl/Tbilisi2009/>

**დ. გაბელაია**, konferenci a Fifth International Tbilisi Summer School in Logic and  
Language - <http://www.logic.at/tbilisi09/>

**დ. გაბელაია**, ლექციათა კურსი Izmir Winter School on Non-Classical Logic and its  
Applications.

**o. furTuxia**, moxseneba A Derivative Operator of Poisson Functionals, konfe-  
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19.

**o. furTuxia**, moxseneba A New Approach to the Definition of Stochastic Derivative  
Operator of Poisson Functionals. konferenci a Stochastic Analysis and Random  
Dynamics, June 14-20, 2009 Lviv, Ukraine, pp. 207-208.

a. **kviniXiZe**, yaliburad invariantuli denebi or nuklonian sistemebSi, 5th International Conference On Quarks And Nuclear Physics (QNP09) 21-26-Sep. 2009, Beijing, China.

a. **kviniXiZe**, moxseneba Gauge invariance in the effective field theory with cutoff, konferencia Modern Problems of Theoretical and Mathematical Physics, September 15-18, 2009, Kyiv, Ukraine.

g. **I avrel aSvil i**, moxseneba Aspects of quantum tunneling with gravity, July 15, 2009, konferencia MG12 (the 12th Marcel Grossmann Meeting on General Relativity and Gravitation), Paris, France

**xvedel iZe**, The XIII International Conference ``Symmetry Methods in Physics'', July 6 -9, 2009, BLTP JINR, Dubna, Russia;

**xvedel iZe**, The International Workshop ``Mathematical Modeling and Computational Physics'', July 7 -11, 2009, LIT JINR, Dubna, Russia.

## **moxsenebebi saqarTvel oSi gamarTul konferenciebze**

**(a) moxsenebebi akademikos nodar berikaSvil is 80  
wl isTavisadmi miZRvniI andria razmaZis matematikis  
institutis konferenciaze, 2009 wl is 2 – 6 noemberi**

**I . efremiZe**, biorlingis Teoremis Sesaxeb gare anal izuri matric funqciebiS Tvis

**v. kokil aSvil i**, koSis singularuli integral ebi da maqsimal uri funqciebi wonian grand I ebegis sivrceebSi

**a. mesxi**, erTwoniani da orwoniani kriteriუმები j eradi riman-  
li iuvil is gardaqmnisaTvis monotonur funqciaTa konusebze

**S. tetunaSvil i**, parametrze damokidebul i operatorebis mimdevrobis Sesaxeb

**o. ZagniZe**, ormagi mwkrivis Sej amebadoba rimanuli meTodiT

**d. gabel aia, g. beJaniSvil i, I . esakia**, stounis sivrceebis I ogika zRvris operatoris terminebSi

**d. pataraia**, kompaqturi hausdorffis bulis algebrebis savsebiT arabmul obis al ternatiuli damtkiceba

**m. jibl aZe**, umartivesi ara-aillenberg-makleinis speqtrebis smeS-  
namravlis algebruli modeli

**T. kandel aki, x. inasariZe**, triangulirebadi kategoriis racionaluri lokalizaciisa da masTan dakavSirebuli grexvis bimodulis Sesaxeb

- a. **paWkoria**, proeqciul i naxevradmodul ebi naxevradrgol ebze val uaciiT arauaryofiT mTel ricxvebSi
- s. **sanebl iZe**, AasaxvaTa homotopiuri kl asifikaciis Sesaxeb
- s. **xaJomia**, berikaSvil is winaaRmdegobis funqtoris erTi modifikaciis Sesaxeb zogad SemTxvevaSi
- a. **el aSvil i**, naxevradmartiv l is al gebraTa gansakuTrebul i nil potentebi
- m. **bakuraZe**, MmaxasiaTebel i kl asebi da ganzogadebul i kohomol ogiebis rgol ebi
- მ. **აშორდია**, ზოგიერთი სასაზღვრო ამოცანა წრფივ სინგულარულ იმპულსურ განტოლებათა სისტემებისათვის
- g. **berikel aSvil i**, დირიხლეს ბიჰარმონიული ამოცანის არალოკალური განზოგადები შესახებ
- j. **gvazava**, gavr cel ebis areSi arawrfivi tal Rebis SeuRwevadobis qvareTa Sesaxeb
- i. **kiRuraZe**, rezonansul i sasazRvro amocanebi arawrfivi diferencial uri gantol ebebisaTvis
- ს. **ხარიბეგაშვილი**, ერთი სასაზღვრო ამოცანის ამოხსნადობის შესახებ მრავალგანზომილებიანი არაწრფივი ტალღის განტოლებებისათვის
- ო. **j oxaZe**, koSis amocana ganzogadebul i arawrfivi gantol ebisaTvis
- რ. დუდუჩავა, დ. კაპანაძე, ო. ჭკადუა, მაქსველის სისტემის ექვივალენტური რეგულარიზაცია
- თ. **ბურუკური**, რ. დუდუჩავა, დ. კაპანაძე, დ. ნატროშვილი, ანი-ზოტროპული მაქსველის განტოლებების ამოხსნის ერთადერთობის შესახებ
- ო. Wkadua, T. buCukuri, r. duducava, d. natroSvil i, metal isa da el eqtrodrekadi sxელ ebis urTierTqmedebis amocanebi sakontaqto zedapi rze bzari T
- s. **xaribegaSvil i**, erTi sasazRvro amocanis amoxsnadobis Sesaxeb mra val ganzomil ebiani arawrfivi tal Ris gantol ebebisaTvis
- r. **gaCeCil aZe**, drekad hemitropul sxელ Ta cal mxrivi kontaqti
- T. buCukuri, ო. Wkadua, sasazvro amocanebi piezoel eqtrobis mindl inis model Si
- r. **bancuri**, drekadobis Teoriis Sereul i amocana bzarebis mqone uban-uban erTgvarovani orTotropiul i sibrtiyisaTvis
- a. **kvini xiZe**, feinmanis diagramebis aj amva nawil akTa raodenobaze SezRudvis gareSe
- z. **cigroSvil i**, Sedgenil i j amebi sadazRvevo da sabanko port-fel ebSi: model irebis, anal izisa da gamoTvl ebis zogierTi aspeqti

(b) moxsenebebi saqarTvel os maTematikosTa me-5 yril obaze,  
baTumi-quTaisi, 9-12 oqtomberi, 2009

I. efremiZe, biorlingis Teorems Sesaxeb gare anal izuri matric-funqciebisatvis

a. kirTaZe, invariantul da kvaziinvariantul zomata TeoriaSi usasrul o kombinatorikis metodebis gamoyenebis Sesaxeb

v. kokiI aSvili, kosis singularuli integral ebisa da maqsimaluri funqciebis SemosazRvrul obis kriteriumebi wonian "grand" l ebegis sivrceebSi da gamoyenebebi sasazRvro amocanebSi

a. mesxi, maqsimaluri da kal deron-zigmundis operatorebi "grand" l ebegis sivrceebTan dakavSirebul moris sivrceebSi

v. paataSvili, hazemanis sasazRvro amocanis Sesaxeb

S. tetunaSvili, parametrze damokidebuli Sejamebadobis metodebis Sesaxeb

o. ZagniZe, mravali cvladis diferenciebadi da harmoniuli funqciebi

b. midodaSvili, s. xaribegaSvili, zogierTi aral okaluri amocana meore rigis Zlierad hiperboluri sistemebisTvis sibrtyeze.

r. duduCava, anizotropuli drekadobis Teoriis gantolebebis hipsibrtyeebze

T. buCukuri, o. Wkadua, r. duduCava, d. natroSvili, bzaris problemis asimptoturi Tvisbebi kompositur struqturebSi

T. buCukuri, o. Wkadua, zogierTi sasazRvro amocana mindlinis piezoel eqtruli modelisatvis

a. gaCeCilaZe, r. gaCeCilaZe, d. natroSvili, calmxrivi sakontaqto amocana drekadi hemitropuli garemosaTvis

r. duduCava, o. Wkadua, d. kapanaZe, Equivalent regularization of Maxwell's system

T. buCukuri, r. duduCava, d. kapanaZe, d. natroSvili, anizotropuli maqsvelis gantolebebis amoxsnis erTaderTobis Sesaxeb

T. buCukuri, o. Wkadua, zogierTi sasazRvro amocana mindlinis piezoel eqtruli modelisatvis

a. gaCeCilaZe, r. gaCeCilaZe, d. natroSvili, calmxrivi sakontaqto amocana drekadi hemitropuli garemosaTvis

T. buCukuri, r. duduCava, d. kapanaZe, d. natroSvili, anizotropuli maqsvelis gantolebebis amoxsnis erTaderTobis Sesaxeb

I. SafaqiZe, On Oscillatory Modes in Viscous Heat-conducting Fluids between two Heated Cylinders.

a. cicqiSvili, z. cicqiSvili, g. cicqiSvili, On the solution of spatial axisymmetric with partially unknown boundaries problems on the theory of jet flows

T. TadumaZe, j .SariqaZe, T.ServaSiZe, andria razmaZis cxovreba da moRvaweoba

o. furTuxia, arawinmswrebi stoqasturi aRricxvis el ementebi puasoni s procesebisTvis

a. kviniXiZe, el ektromagnituri form-faktorebi da partonul i ganawil ebebi; vel is kvanturi Teoriis dinamikur gantol ebebSi

(g) moxsenebebi i. vekuas saxel obis gamoyenebiTi maTematikis institutis seminaris gafarToebul i sxdomebze, Tbil isi, 22 - 25 april i, 2009

s. xaribegaSvil i, o. j oxaZe, darbus pirvel i amocana hiperbol uri tipis arawrfiv diferencial ur gantol ebaTa erTi kl asisaTvis

n. Savi ayaZe, erTi tipis integro-diferencial uri gantol ebis miaxl oebiTi amoxsnis Sesaxeb

l . SafaqiZe, temperaturul i gradientis gavl ena or forovan cil indrs Soris moTavsebul siTxis mdgradobaze

a. cicqiSvil i, z. cicqiSvil i, r. cicqiSvil i, siTxis stacionarul i nakadis moZraoba or araTanaRerZul siTxeSeRwevad (siTxeSeuRwevad) cil indrul zedapirebs Soris

z. qvaTaZe, T. ServaSiZe, pirobiT damouki debel i SemTxveviTi sidi deebis normal uri aproqsimaciis siCqaris Sesaxeb

T. ServaSiZe, v. tariel aZe, zRvariTi Teoremebi damouki debel SemTxveviT veqtorTa usasrul o seriebisatvis