

## QUESTIONNAIRE

(\*) – mandatory fields

	<b>Details about organisation</b>
<b>* Organisation name</b>	A. Razmadze Mathematical Institute
Organisation acronym	RMI
<b>* Organisation Activity Type</b> (RES - Research, HE - University, SME - Small and Medium Enterprise, IND - Industry, OTH - Other)	RES
<b>* Keywords of main research areas</b>	Algebra; Mathematical Logics; Geometry and Topology; Mathematical Analysis; Differential Equations; Mathematical Physics; Elasticity Theory; Theoretical Physics; Probability Theory and Mathematical Statistics.
<b>* Head of organisation (first name, family name)</b>	Nino Partsvania
<b>* Post code</b>	0193
<b>* Country</b>	GEORGIA
<b>* City</b>	Tbilisi
<b>* Street, House</b>	1 M. Aleksidze St.
<b>* Telephone (+ country &amp; city codes)</b>	+995-32-334595
<b>* Fax (+ country &amp; city codes)</b>	+995-32-364086
<b>* E-mail</b>	ninopa@rmi.acnet.ge

<b>* Description of organisation and its research achievements for the last five years (~ 5000 signs)</b>
<p>A. Razmadze Mathematical Institute is a research organization with 9 scientific departments: Department of Algebra; Department of Mathematical Logics; Department of Geometry and Topology; Department of Mathematical Analysis; Department of Differential Equations; Department of Mathematical Physics; Department of Elasticity Theory; Department of Theoretical Physics; Department of Probability Theory and Mathematical Statistics.</p> <p>Main achievements for the last five years:</p> <ul style="list-style-type: none"> <li>• On the basis of spectrums of algebraic and topological <math>K</math>-theories, a spectrum of non-divided Kasparov <math>KK</math>-theory is constructed.</li> <li>• A new class of topological spaces, close to Alexandroff's spaces, is described, for which the Cantor-Bendixon derivative's operator gives an interpretation of a certain system of intuitionistic modal logics.</li> <li>• A complete rational homotopy invariant is constructed in terms of <math>A(\infty)</math>-algebra, existing in rational cohomology.</li> <li>• Solution of two-weighted problems for a wide class of integral operators, establishment of necessary and sufficient conditions for the curves and weights ensuring boundedness of Cauchy type integrals in variable exponent Lebesgue spaces, estimation of measure of non-compactness for operators of harmonic</li> </ul>

analysis in weighted Lebesgue spaces.

- Optimal sufficient conditions are obtained for the solvability and unique solvability of: 1) of regular and singular boundary value problems for ordinary differential equations (in particular, of two-point boundary value problems for higher order differential equations with strong singularities; of periodic problems at resonance; of boundary value problems with conditions at infinity); 2) of nonclassical boundary value problems for nonlinear hyperbolic type partial differential equations.
- A stratified general bianisotropic medium is considered, consisting of several infinite slabs either between two half-spaces filled with isotropic material, or grounded. The slab is illuminated by an incident plane wave from one of the half-spaces. The excited electromagnetic field inside the bianisotropic slab and in the isotropic domains is described.

1.

	<b>Contact Information</b>
<b>* Contact person (first name, family name)</b>	Ivan Kiguradze
<b>* Department / Laboratory</b>	Department of Differential Equations
<b>* Position</b>	Head of the Department
<b>* Qualification and research experience</b>	Mathematician, Doctor of Sciences, Academician of the Georgian National Academy of Sciences; Author of more than 160 scientific works.
<b>* Post address (house, street, city, code, country)</b>	1 M. Aleksidze St., Tbilisi 0193, GEORGIA
<b>* Telephone (+ country &amp; city codes)</b>	+995-32-363190
<b>* Fax (+ country &amp; city codes)</b>	+995-32-363180
<b>* E-mail</b>	kig@rmi.acnet.ge

**International co-operation / Participation in EU RTD programmes or other bilateral / multilateral actions**

INTAS, TACIS, TEMPUS, COST, EUREKA, other RTD programmes (please specify programme/s, project title/s and year/s)

- 1) INTAS Grant # 96-1060: "Nonlinear elliptic and parabolic equations. Qualitative and asymptotic properties of regular and singular solutions" (1997-1999).
- 2) Research Grant of the Greek Ministry of Development in the framework of Bilateral S&T Cooperation between the Hellenic Republic and the Republic of Georgia: „Singular boundary value problems for ordinary differential equations and their applications to oscillation theory“ (2001).
- 3) INTAS Grant # 00136: "Systems of quasilinear partial differential equations and inequalities. Existence and nonexistence of solutions" (2001- 2003).
- 4) INTAS Grant # 03-51-5007: "Nonlinear evolution equations. Blow-up phenomena. Stability and instability" (2004-2007).

**\* Please, use "X" to indicate the scientific**

	area/s of your potential project
CHEMISTRY	
SOCIAL AND HUMAN SCIENCES	
ECONOMIC SCIENCES	
ENGINEERING SCIENCE	
ENVIRONMENT	
AGRICULTURE AND FOOD	
HEALTH	
MATHEMATICS	X
INFORMATION SCIENCE	
PHYSICS	
NANOTECHNOLOGIES	
ENERGY	
TRANSPORT	
SPACE	

<b>* Summary of potential research project envisaged hosting of European researcher for the period of between 1 and 2 years</b>
<p><b>Summary of potential research project:</b>  For higher order functional differential equations, nonlocal problems will be considered, particularly, problems with integral conditions and multi-point problems. To study these problems, a method will be elaborated which will be based on a priori estimates of solutions of one-sided functional differential inequalities under the nonlocal boundary conditions. Using this method, it is intended to establish optimal, in a certain sense, sufficient conditions guaranteeing, respectively, the solvability and well-posedness of the above-mentioned problems both in resonance and non-resonance cases.</p>

	<b>Please, confirm your agreement on data publication and dissemination</b>
<b>I agree with the publication of the data</b> on the web-site <a href="http://www.inco-ecca.net">http://www.inco-ecca.net</a> , and <b>dissemination</b> among Mobility National Contact Points of the EU MS and AC <b>(YES / NO)</b>	YES
<b>Date</b>	December 8, 2008

2.

	<b>Contact Information</b>
<b>* Contact person (first name, family name)</b>	Vakhtang Kokilashvili
<b>* Department / Laboratory</b>	Department of Mathematical Analysis
<b>* Position</b>	Head of the Department
<b>* Qualification and research experience</b>	Mathematician, Doctor of Sciences, Author of 200 papers and 5 monographs
<b>* Post address (house, street,</b>	60 Nutsubidze Str., Tbilisi 0177, GEORGIA

city, code, country)	
* Telephone (+ country & city codes)	+995-32-397713
* Fax (+ country & city codes)	+995-32-364086
* E-mail	kokil@rmi.acnet.ge

<b>International co-operation / Participation in EU RTD programmes or other bilateral / multilateral actions</b>
INTAS, TACIS, TEMPUS, COST, EUREKA, other RTD programmes (please specify programme/s, project title/s and year/s)
<p><b>1) INTAS Grant No: 06-1000017-8792 (2006-2008) “Variable Exponent Analysis”</b></p> <p><b>2) INTAS Grant No: 05-1000008-8157 (01.09.2005-01.09.2008) “Function Spaces and Applications to Partial Differential Equations”</b></p>

	<b>* Please, use “X” to indicate the scientific area/s of your potential project</b>
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<b>* Summary of potential research project envisaged hosting of European researcher for the period of between 1 and 2 years</b>
<p>The aim of the potential research project is to investigate those problems of modern analysis which are motivated not only by the need in solution of applied problems, but also by the need in the theory of partial differential equations, spectral theory of differential operators and nonlinear analysis.</p> <p>The project’s objectives:</p> <ul style="list-style-type: none"> <li>• Two-weighted problems for integral transforms defined on general structures in weighted Morrey spaces with non-standard variable order.</li> </ul>

- Applications of two-weight criteria for potentials with product kernels to weighted Strichartz and lifespan estimates for a solution of non-linear wave equations.
- To establish weighted norm estimates for multipliers of the Fourier transform defined on Euclidean spaces and on Heisenberg groups.
- Measure of non-compactness, singular and approximation numbers for integral operators in nonstandard Banach function spaces.
- Boundary value problems in “bad” domains for harmonic and analytic functions in the frame of function spaces with non-standard variable growth order.

AMS Subject Classification:  
**48B38, 45B02, 42B25, 42A24**

	<b>Please, confirm your agreement on data publication and dissemination</b>
<b>I agree with the publication of the data</b> on the web-site <a href="http://www.inco-ecca.net">http://www.inco-ecca.net</a> , and <b>dissemination</b> among Mobility National Contact Points of the EU MS and AC <b>(YES / NO)</b>	<b>YES</b>
<b>Date</b>	December 7, 2008