

MS- Regularization of classical singular problems within generalized continuum theories: stress concentration, cracks, contact interactions, edge forces, dislocations.

Victor A. Eremeyev (Università degli Studi di Cagliari, Italy),

Sergey A. Lurie (Institute of Applied Mechanics of Russian Academy of Sciences, Russia),

Mikhail Yu. Gutkin (Institute of Problems of Mechanical Engineering, Russian Academy of Sciences, Russia)

Yury O. Solyaev (Institute of Applied Mechanics of Russian Academy of Sciences, Russia).

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Nowadays one of the main problems modern mechanics is to prescribe the micro-scale mechanical effects needed to get a specific desired behavior at the macro-scale. To a large extent, this refers to microstructure dependent size effects that have been exhibited by many applied problems of the mechanics of solids and physics, including the phenomena of the material failure. Applied problems of generalized continuum theories that allow transferring the class of singular elasticity problems to the corresponding class of regular problems are of considerable interest. On the one hand, they describe some limiting states, and on the other hand, they allow using the criteria for limiting states, formulated for regular solutions and having a clear physical meaning.

Thus, we organize this mini-symposium to provide the wide and deep discussion on the latest research related to the possible regularization of classical singular solutions within generalized continuum theories and its application in the real life problems. Theoretical and applied topics in the field of crack problems, dislocations, inclusion problems and contact interactions are invited. Analytical and numerical approaches, which provide an elimination of the non-physical singularities due to accounting for the high-grade and microstructural effects are of main interest. Possible topics can be also related to the experimental validation of the models and identification of the length scale parameters for the certain type of materials. Relation between generalized continuum theories and atomistic models, including identification of the length scale parameters based on molecular dynamics simulations and first-principles calculations are also invited.