4th Polish Congress of Mechanics & 23rd International Conference on Computer Methods in Mechanics
PCM-CMM-2019
September 8-12, 2019, Krakow, Poland

MULTISCALE MODELLING OF MATERIALS AND STRUCTURES

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SUMMARY

The objective of the mini-symposium will be to gather researchers working on different aspects of modelling the phenomena occurring in various scales, from nano through micro and mezo to macro scale, and to enable exchange of experience. The scope of the minisymposium will include:

□ Conventional multi scale approaches based on the FE (XFEM, GFEM, FE2).

□ Theoretical basis of various applications of multiscale analysis techniques, such as Monte Carlo (MC), Cellular Automata (CA), Molecular Dynamics (MD), Phase Field, etc.

□ Homogenization methods.

□ Alternative multiscale methods: e.g. combination of the CA-FE method, Neuro-Fuzzy Cellular Automata–Finite Element technique (nF-CAFE) or Neuro Expert Cellular Automata–Finite Element models (NESCAFE).

□ Development of the statistically representative volume elements.

□ Multiscale approaches based on the mesh free methods and particle methods.

□ Applications of the multiscale modelling to existing and future industrial problems such as melting, casting, welding, laser treatment, joining, forming, semi-solid metalworking, injection moulding, molecular beam epitaxy, and others.

□ Solving microstructural problems, such as solidification, microstructure evolution, phase transformations, crack propagation, strain localization and others.

□ Computing costs of multiscale modelling, applications of High Performance Computing.

□ Development of new multiscale approaches, including optimization and inverse approach.