Multi scale analysis in global optimisation strategies

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In today's fast developing world, where metal processing industry is forced to meet new requirements, a lot of attention is put on optimisation of metal processing operations accounting for various scales, in which particular contributing processes occur. Main support to industry is based on the commonly used finite element modelling, starting from single processes and finishing on the modelling of the complete production cycles or even complete life cycle of material. FE models contain millions different variables related with rheological models, number of the FE elements or variables related with process design and control. However not only conventional FE approaches can be used, many alternative micro or micro-macro approaches based i.e. on discrete methods are used what leads to further increase in number of variables.

Creation of a global optimisation strategies is of the importance to ensure reduction in the calculation time. All those optimisation aspects lead to decrees of material loses and finally lead to the most important aspects from economical point of view, reduction in production costs.

The main goal of this minisymposium is to focus on the existing and future industrial optimisation problems covering creation of the global optimisation strategies for small and large scale problems based i.e. on the topology optimisation, shape optimisation, material optimization or bead optimisation. Multi scale analysis method should be the main part of the models.

Recapitulating, papers dealing with following topics are invited:

✓ Global optimization problems based on multiscale analysis applied to production planning and control, material flow, etc.

✓ Multi scale analysis combining finite element method with discrete methods (Monte Carlo, molecular thermodynamics, particle methods, cellular automata) in application to simulation of processes.