

A Meshless Slice Model for Continuous Casting and Hot Rolling of Steel

*B. Šarler^{1,2,3}, A.Z. Guštin², U. Hanoglu¹, R. Vertnik^{1,4}, I. Vušanović⁵

¹Laboratory for Multiphase Processes, University of Nova Gorica, Vipavska 13, SI-5000, Slovenia.

²Laboratory for Simulation of Materials and Processes, Institute of Metals and Technology, Lepi pot 11, Ljubljana, Slovenia

³Laboratory for Advanced Materials Systems, COBIK, Tovarniška 26, SI-5270 Ajdovščina, Slovenia

⁴Štore Steel, Technical Development, Železarska cesta 3, SI-3220, Štore, Slovenia

⁵Faculty of Mechanical Engineering, University of Montenegro, George Washington Street, 81000 Podgorica, Montenegro

*Corresponding author: bozidar.sarler@ung.si

The aim of this paper is to demonstrate the suitability of the novel Local Radial Basis Function Collocation Method in a coupled thermo-mechanical problem of continuous casting and hot rolling of long products from steel. The physical concept of such a nonlinear and large deformation problem is based on mixture continuum assumption and on a two dimensional traveling slice model, which assumes deformation and heat flow only in the perpendicular direction to casting and rolling. The solution procedure is based on local collocation on a five noded influence domains with scaled multiquadrics radial basis functions, augmented with the first order polynomials. The node redistribution is based on transfinite interpolation and elliptic node generation. The microstructure model is based on the novel meshless point automata model. The steel used in the calculations is assumed to have an ideal plastic behavior. Several realistic industrial examples are shown.

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