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2D and 3D Unsteady Simulation of the Heat Transfer in the Sample during Heat Treatment by Moving Heat Source

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Abstract : The aim of the performed work is to establish the 2D and 3D model of direct unsteady task of sample heat treatment by moving source employing computer model on the basis of finite element method. The complex boundary condition on heat loaded sample surface is the essential feature of the task. Computer model describes heat treatment of the sample during heat source movement over the sample surface. It is started from the 2D task of sample cross section as a basic model. Possibilities of extension from 2D to 3D task are discussed. The effect of the addition of third model dimension on the temperature distribution in the sample is showed. Comparison of various model parameters on the sample temperatures is observed. Influence of heat source motion on the depth of material heat treatment is shown for several velocities of the movement. Presented computer model is prepared for the utilization in laser treatment of machine parts.

Keywords : computer simulation, unsteady model, heat treatment, complex boundary condition, moving heat source
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