

*Special Issue Reprint*

## **Metalworking Processes: Theoretical and Experimental Study**

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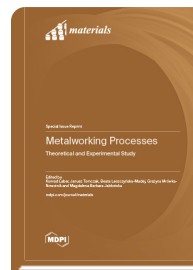
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The modelling of structural and mechanical properties in metal thermomechanical treatment processes and technical alloys is a crucial research area, and it is currently at the center of interest of scientific centers dealing with materials engineering and plastic working processes. Performing direct tests under industrial conditions for the development of such processes is too costly and usually does not allow for the optimization of process parameters. Therefore, it is justified to develop methods of optimizing technological processes, ensuring the receipt of a product with the required mechanical properties based on modern methods of numerical and physical modelling. By using modern computer programs based on the finite element method, it is possible to carry out numerical simulations of technological processes. Computer simulation also enables the design and optimization of industrial processes without long-term and costly experiments in the technological line. Mathematical modelling also enables the determination of the parameters necessary for physical modelling by using metallurgical process simulators. However, numerical modelling alone does not allow for the accurate prediction of the mechanical properties and microstructure of the tested material. The use of the physical simulation methods is a supplement to mathematical modelling, which allows for solving

problems encountered in the development of new production processes with high

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