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«Design and research on an electric drive of cold pilger mill»

Abstract

This master’s thesis focuses on the design and research of an electric drive for a cold pilger mill, a critical machine used in the metalworking industry for the rolling of pipes. The study includes the development of a mathematical model that captures the kinematic processes within the mill, including a block for the crank mechanism and a load diagram generation block.

Through the analysis of real and generalized load diagrams, the research identifies optimal parameters for the synchronous motor and its vector control system, which are crucial for achieving desired transient responses. The thesis also investigates the selection of the mechanical converter's gear ratio, determining that a ratio of 15 minimizes the payback period and optimizes efficiency by balancing electrical losses and gearbox costs.

By implementing a rational control method, the study significantly reduces electrical losses associated with the variable loads in pilger mills, enhancing both productivity and product quality. The findings contribute to the broader field of mechatronic systems for industrial applications, offering practical insights into the optimization of electric drives in cold rolling mills.

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understanding of the electric drive system's dynamics, paving the way for future advancements in industrial electric drive applications.