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Modeling and analysis of the churning losses characteristics of swash plate axial piston pump

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Abstract:

High efficient use of axial piston pumps is a key demand for fluid transmission systems today. The efficiency characteristics of piston pumps is mainly studied on the volume losses and the mechanical damage. However, when the pump is working at high speed, small displacement and low pressure conditions, the churning losses due to the rotation of the pump accounts for the main factors of the total losses in the axial piston pump. Therefore, this paper established a mathematical model of an axial piston pump churning losses, and set up the coupling simulation model of piston pump rotation components that combined with commercial software. Simulation analyzing and verifying the churning losses varied with different working conditions. Then finding out the main factors which affected the churning losses. Finally providing guidance methods to further calculate the efficiency of the axial piston pump.

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