Maha Fluid Power
RESEARCH CENTER

PURDUE
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- WEBINAR SERIES -

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A Multi-Physics Model for Axial Piston Machines

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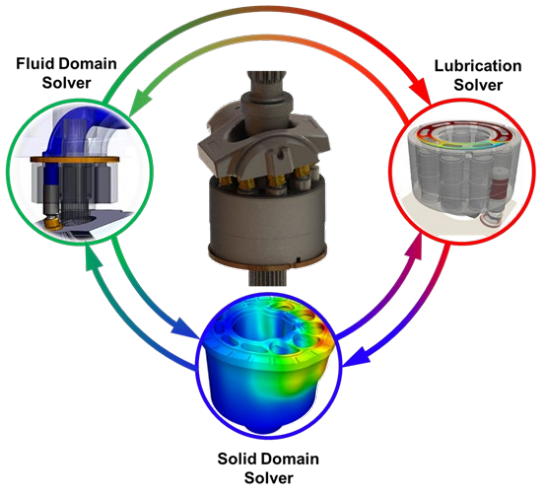
Abstract

Axial Piston Machines (APMs) find use in a wide range of the applications owing to their high pressure capability, power density and energy efficiency. Their basic design principle dates back centuries, however, there always has been a drive to formulate new APMs with better performance parameters or capable to meet different application requirements.

Many literature studies show how the lubricating interfaces of these units (i.e. the piston/cylinder interface, the cylinder block / valve plate interface, and the slipper/swash plate interface, for a swash plate type unit) are key for determining their energy efficiency and durability. The behavior of such lubricating interface is highly affected by several thermo-elasto-hydrodynamic phenomena, which are typically considered empirically or through very simplified models.



This webinar describes the multi-physics approach to model the fluid displacing action and the lubricating features of APMs (Multics-CASPAR). The model considers the main flow characteristics of the machines through a lumped parameter approach. The solution of the flow features and the energy dissipation in the lubricating interfaces are coupled with the lumped parameter model. Elasto-hydrodynamic and Thermo-elasto-hydrodynamic effects due to the deformation of the solid bodies in the machine are incorporated in the model as well.

After describing the simulation approach, the webinar will also detail significant results and validation of the model. Additionally, a few critical studies of interest such as the the spin of the pistons inside cylinder bores and innovative designs explored using the model will be discussed.

Join this webinar to learn more about modeling approach utilized for Axial Piston Machines.

(*) *The webcast link will be shared to Maha members, as well as to companies interested in joining the Maha center.*

For more information on the webcast, and for receiving the webcast link, please contact avacca@purdue.edu, or shangl@purdue.edu, or Prithvi at pchandir@purdue.edu