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## Design of A Test-Rig for Measurements on Gerotor Units

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### ABSTRACT

Gerotor pumps are a kind of fluid power machines widely used in the automotive field, especially for fuel injection as well as lubrication. To improve the performance of these units, virtual prototyping is necessary to decrease time and cost related to trial and error. Within this research a simulation model for Gerotor units has been developed with the aim of predicting accurately the performance of a generic unit. The model can accurately predict the system behavior regarding mechanical and volumetric losses by considering real machining tolerances and their interactions. Ultimately, this model should help to design new generations of Gerotor units and to improve existing ones by improving their efficiency. To justify and refine the model, a test-rig which can enable measurements of rotor micro-motions of the gears of Gerotors is needed. This paper proposes an innovative approach for measuring micro-motions together with the design of a test-rig specifically conceived to allow such measurements. Reference Gerotor units will be put in a specially designed pump housing. The measurements will be performed using capacitive sensors capable of measuring the lubricant film thickness in the lubricated gaps. In this way, the micro-motions of the reference Gerotor unit can be detected. A data acquisition system will be created to collect the experimental data. Results will be analyzed to understand the correctness of the prediction given by the model. With these results, the lumped parameter model is expected to be validated or refined allowing more precise predictions in the future.

### KEYWORDS

Gerotor, Gear pumps, Pump modelling, Test-rig, Fluid power