

Abstract Submitted
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Numerical analysis on cavitation inception in the rotary valve of the power steering system¹ GWANG NYEON RYU, Department of Mechanical and Aerospace Engineering, Seoul National University, SUN HONG PARK, MANDO, MYUNG HWAN CHO, JUNG YUL YOO, Department of Mechanical and Aerospace Engineering, Seoul National University — The power steering valve directs the power steering oil to either side of a power piston and relieves the driver of the effort to turn the wheel, when a driver begins to operate the vehicle. It is well known that hiss noise occurring at that moment is caused mainly by cavitation of the oil inside the rotary valve. However, it is very difficult to check the flow pattern and the cavitation inception experimentally because of the complex geometry and high pressure in the interior of the rotary valve. In spite of the increasing interest in this flow phenomenon inside the rotary valve, only few studies have been reported. In the present study, this complex oil flow inside the rotary valve has been analyzed numerically using three-dimensional cavitation model provided by the commercial code, FLUENT 6.2. It is confirmed that the location of cavitation inception is similar to that obtained by the existing two-dimensional numerical analysis. Then, the volume fraction of oil vapor has been compared with the hiss noise level measured experimentally in a semi-anechoic room.

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