Numerical Prediction of Flow and Heat Transfer on lubricant Supplying and Scavenging Flow Path of an Aero-Engine Lubrication System

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Abstract

This paper presents a numerical model of internal flows on lubricant supplying and scavenging flow path of an aero-engine lubrication system. The numerical model was built in the General Analysis Software of Aero-engine Lubrication System (GASLS), developed by Northwestern Polytechnical University. The lubricant flow flux, pressure and temperature distribution at steady state were calculated. GASLS is a general purpose computer program employed a 1D steady state network algorithm for analyzing flowrates, pressures and temperatures in a complex flow network. All kinds of aero-engine lubrication systems can be divided into finite correlative typical elements and nodes from which the calculation network is developed in GASLS. Special emphasis is put on how to use combinational elements which is a type of typical elements to replace some complex components such as bearing compartments, accessory drive gearboxes or heat exchangers. This method can reduce network complexity and improve calculation efficiency. The computational results show good agreement with experimental data.

Figure : The lubricant supplying and scavenging system flow network built in GASLS

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