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Abstract

The problem of high noise levels generated by hydraulic systems is well known. In commercial aircraft hydraulic systems are located close to passengers. Therefore, hydraulic noise emission can affect the passengers comfort due to continued disruptive noise. Passive pulsation dampers installed downstream the pump are state of the art in aircraft hydraulic systems. Nevertheless, new functional requirements such as variable pump speed demand novel pulsation damper concepts which are presented in this paper.

Various tests have been performed on both, aircraft and hydraulic test rig in order to analyze the mechanisms of hydraulic noise generation and transmission. The pressure and flow pulsations generated by the pump have also been measured. Based on that, pulsation damper concepts have been developed. The focus is on active or adaptive dampers, which are capable to adapt to changed operation conditions.

A dedicated fluid-borne noise test rig was set up which enables the measurement of fluid-borne noise characteristics of aircraft hydraulic components. The results can be used to rate different pumps by their noise characteristic or determine the transmission loss of damper devices. Furthermore, simulation models can be derived which enable the prediction of pressure pulsations in hydraulic circuits.