



Material behavior of hydraulic fluids under the influence of thermoelasticity and entrained air

By Rainer Haas

Trauner Verlag Aug 2013, 2013. Buch. Book Condition: Neu. 20.8x14.6x cm. Neuware - Oil compressibility plays an important role in the analysis and design of hydraulic circuits - especially in fast switching systems. A characteristic example for the need of proper compressibility laws is wave propagation in low pressure lines where outgassing of air is likely to occur. The strongly pressure dependent, hence nonlinear compressibility of the oil-gas bulk in such cases has a strong influence on such lines' transmission properties. Only with proper fluid compressibility laws and computationally efficient simulation techniques a significant theoretical analysis is possible. Such analysis methods are indispensable tools for a systematic design optimization of hydraulic systems exhibiting such nonli-near compressibility behavior. In the first part of the thesis different simulation tech-niques for the dynamic 1D flow in a straight transmission line with a nonlinear compressibility law and frequency dependent friction are studied and compared. The results provide useful information for the selection of a particular method for a particular problem. The second part of the thesis deals with the identification of a pressure and temperature dependent compressibility law of hydraulic oil. Data for this identification were obtained from two specially designed test rigs for...



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