

Simulation of front loader cycle

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Objective

The objective of this master thesis is to perform a theoretical investigation of front loader cycle behavior and produce simulation model concepts for future optimization strategies.

Introduction

Nordhydraulic delivers hydraulic valves and controls for mobile systems where high quality and reliability is required. Customer satisfaction is important for Nordhydraulic, we provide our customers with highly advanced design solutions that aim to optimize controllability and performance of their machines.

At the present time the front loader valves are designed using conservative methods. The front loader valves are designed for the worst load point possible during the load cycle, this leads to a compromise between efficiency and functionality where efficiency will vary during the cycle. The varying degree of efficiency leads to a waste of energy.

Thesis description

This thesis work includes understanding of mobile hydraulic systems, understanding the principles of open-loop systems and translating them to a theoretical mathematical model.

1. Develop mathematical models of the front loader cycle and the hydraulic system to develop simulation models using simulation tools like Matlab, Hopsan, AMESim or others.
2. Implement or suggest methods of verifying the simulation model.
3. Investigate on different methods to improve the front loader cycle efficiency

Additional information

Scope: Suitable for 1-2 master students (2 students recommended)

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