

Optimization and Synthesis for a Mechatronic Network

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Abstract

This paper applies a novel mechatronic system to vehicle suspensions. The proposed mechatronic system consists of a ball-screw inerter and permanent magnet electric machinery (PMEM), such that the system impedance is a combination of mechanical and electrical networks. Then we apply linear matrix inequalities (LMI) to optimize system performance, and discuss network synthesis of the obtained optimal impedances. The results demonstrate the effectiveness of the mechatronic system and newly introduced network synthesis methods