D.Eng. Dissertation Defend Examination

Presented by Mr.Phuriwat Rasameekunwit

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Neural Network Control for a Model of Active Suspension System

Abstract

To address railway-induced vibrations in urban heavy rail systems, this thesis develops a novel active suspension control strategy for enhanced ride comfort and safety. In addition, a hybrid suspension system, demonstrating improved vibration isolation performance, is implemented. The dissertation compares the performance of a more detailed three-mass quarter vehicle model with that of a conventional two-mass quarter vehicle model commonly used for passenger cars. Both suspension systems are designed using a Neural Network (NN) control scheme, which effectively handles the complex, nonlinear dynamics associated with uncertain track irregularities. Their performances are compared against conventional Linear Quadratic Regulator (LQR) and Model Predictive Control (MPC) schemes through simulations involving impulse, step, periodic, and stochastic excitations. The evaluation is conducted according to established safety and comfort criteria, including the three-sigma method and the EN 12299 standard.

Date:	Time:	Venue:
08.12.2025	08.^{00}-12.^{00} h	TGGS building, 307 BERLIN