

Simulation and Optimization Tool for Continuously Variable Chain Drives

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Abstract: Continuous variable chain drives for automotive applications have to satisfy high requirements to compete with common gears. To meet these demands improvements of certain dynamic properties of CVTs (Continuous Variable Transmission) are desired. Those shall be realised by applying numerical simulation techniques and an optimisation algorithm. In this contribution a tool for both simulation and optimisation of the chain drive is presented. This tool contains a detailed dynamical model of the CVT which allows its simulation and analysis. Further the model is used for evaluation of the performance of the chain drive which is required for the optimisation process. The system features a high complexity with more than 60 bodies and the same number of mechanical contacts. Advanced numerical and modelling techniques are applied to solve the challenging task to reduce computational effort for the simulation. Nevertheless, the target function for optimisation is very costly which requires the utilisation of an appropriate optimisation algorithm. The capabilities of the presented tool are shown by solving an industrial optimisation problem.

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