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TALLINN UNIVERSITY OF TECHNOLOGY

DEPARTMENT OF ELECTRICAL POWER ENGINEERING AND MECHATRONICS

MASTER'S THESIS

MODELING AND CONTROL OF HYBRID VEHICLE

HÜBRIIDSOIDUKI MODELEERIMINE JA KONTROLLIMINE

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5. SUMMARY

In this work, parallel hybrid electric vehicle is modeled using matlab simulink. This thesis is divided into 4 basic parts. In chapter 1 the background of the hybrid vehicle is explained very well. As hybrid and electrical system of automobiles passed through a tough time due to political problem round the world so its political situations during last few decades also discussed. In second part, the configurations of hybrid vehicle is explained and its different types are mentioned with images.

As this technology improves day by day so new technique of hybrid technology is also explained with specific methods. In third part of it, modeling of parallel hybrid vehicle is formulated with block diagrams and simulations. Matlab/Simulink was very helpful in providing required modeling of all main blocks of this vehicle. The distribution of power among electric motor and gasoline engine is explained with equations that is very important and useful part take a look on it because good distribution of power can optimize fuel in a very good manner.

In fourth part of this study, the analysis of all three transmission are discussed theoretically and also graphically. Drive cycle are used to test the fuel milage of vehicles. Most famous EUDC and NEDC FTP_75 drive cycles are used for this purpose. From the graph it can be seen that by increasing number of gears from 4th to 6th the drive of vehicle becomes smooth and its fuel consumption is very good.

In case of FTP_75, initially for 4th gear automatic transmission it was showing higher values but in case of 6 speed transmission it was showing most beneficial results with 0.112L. So it is obvious from these values that by increasing number of gears the cost gets high little bit but most importantly these vehicle save fuel and alternately they are saving thousands of CO₂ from environments to pollute it.

Tire radius of tire is also considered in this study. As well as, the radius of tire decrease the fuel used by vehicle also decreases. The minimum fuel used by 6 speed transmission with 0.584L is also shown in the graph.