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Optimal Configurations of Hybrid Electric Vehicle Powertrain

Modern life is impossible without movement. Vehicles stay integral part of our everyday life. Besides, internal combustion engines (ICEs) use oil as the only source of energy. That causes serious problems for environment and human life. It leads to the increase of greenhouse gases and global warming. The cost of oil grows up every year because the world oil reserves are diminishing.

Hybrid electric vehicle (HEVs) could be a solution to the problems in question. HEVs have an electric motor as well as an ICE that could “curve down” pollution and fuel consumed.

There are two basic configurations of HEVs: a series and a parallel ones.

A series configuration needs three propulsion components: ICE, generator, and motor. That means that a vehicle will be heavy and expensive. In series configuration only the electric motor provides all the propulsion power. In comparison with the series configuration, the parallel one needs only two smaller propulsion components: ICE and motor. The performance of the parallel configuration is much higher than series because the propulsion power may be supplied by the heat engine, by the battery-motor set, or by the two systems combined. The operation mode of ICE can be adjusted with the help of the electric motor and thus, will make a vehicle more economical. The efficiency of HEVs with parallel configuration is up to 60%. That is more than for conventional ICE's (35%).

Hybrid electric vehicle in parallel configuration could be a solution of environmental problems until purely electric vehicles become available and the costs for their maintenance are reduced. In case this way of development is chosen, we will make production of vehicles cheaper and more available for people.