CONES: Matlab code for convex optimization in electromobility studies

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The electrification of vehicles plays an important role in the reduction of energy consumption and pollutant emissions of ground transportation. With the goal of improving energy efficiency and employing renewable energy sources, vehicle manufactures are currently introducing several types of electrified vehicles. Competing concepts introduced to the market are electric vehicles (EVs), hybrid electric vehicles (HEVs), plug-in hybrid electric vehicles (PHEVs), fuel cell vehicles (FCVs), fuel cell hybrid vehicles (FCHVs), etc. With the introduction of new vehicle concepts, vehicle manufacturers also encounter new computational challenges, such as optimal sizing of powertrain components and optimal arbitration of traction power among multiple power sources. This work presents a convex programming framework for the combined design and control optimization of electrified vehicles. The key element is the convex modeling of powertrain components, such as internal combustion engine, electric machine, engine-generator unit, fuel cell system, electric battery, electric capacitor, etc. A complete Matlab code is provided that addresses realistic vehicle design and control problems.

The library of optimization examples in Matlab can be found at
https://chalmersuniversity.app.box.com/cones