Electric Motorcycle Modeling for Speed Tracking and Range Travelled Estimation

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Abstract

With the massive interest in electric vehicle technology, all different types of vehicles are moving toward green awareness, including the motorcycle. As time progresses, the investigations on the motorcycle developed to an even more complex model as the model need to be able to include the dynamics of the motorcycle at high speed. Relatively, few works of the literature found on an electric motorcycle (MC) modeling. Therefore, this paper aims to develop an E-MC model that represents a realistic model of the motorcycle with both kinematics and dynamics of the motorcycle incorporated in the model. The developed model is then tested for the speed tracking and the range travelled to evaluate the performance. Two different driving cycles that commonly applied in the commercial motorcycle evaluation test are used as the driving profiles in the simulation, namely, the Worldwide Motorcycle Test Cycle and New European Driving Cycle profiles. The results show an evident ability for the developed model of the E-MC to track the speed profile. It is also noted that the distance travelled by the E-MC model can be effectively determined.

Keywords

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