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**Model predictive control of hybrid electric vehicles for improved fuel economy.** (English)

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**Summary:** This brief proposes a model predictive control method using preceding vehicle information within Hybrid Electric Vehicles' (HEVs') predictive cruise control system to improve car following performance and reduce fuel consumption. This paper adds two original contributions to the related literature. First, a real-time optimization approach using Pontryagin's minimum principle with analytical methods rather than numerical iteration methods is proposed. Second, to compute the desired battery state of charge trajectory as a function of vehicle position, only the topographic profile of the future road segments must be known. Both the fuel economy and the driving profile are optimized using the proposed approach. Simulation results show that fuel economy using the proposed method is improved significantly.

**MSC:**

93B40 Computational methods in systems theory (MSC2010)

93C95 Application models in control theory

49N90 Applications of optimal control and differential games

**Keywords:**

model predictive control; hybrid electric vehicles; car following; driving profile; fuel economy

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