Modelling the hybridisation of human and artificial energy applied at an electrical bicycle

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Abstract: This paper details an energy-oriented model of a generic electrical bicycle. Such a model is designed to i) evaluate some proposals of assistance control laws and ii) plan experiment to evaluate them with a given technological electric bicycle and a given set of human users. The different parts of the global human-machine system are detailed, the human behavior being idealized by a torque/speed characteristic together with a pedaling, braking, and gear shifting policies. Experiencing the model with or without permanent assistance gives realistic results.

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