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## マルチモーター電気自動車の グローバル(グローバル/ローカル)エネルギー管理

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### Glocal (Global/Local) Energy Management for Multi-motor Electric Vehicles

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### 研究概要

Electric vehicles (EVs) become an important solution to tackle the global warming. In recent years, the research community has observed the uptrend in the number of motor actuators installed in EVs. Consequently, we are benefited from the more powerful means of transportation. On the other hand, it is essential to develop methodologies to allocate the motor commands such that the limited energy of an EV can be used effectively and safely. However, the motion control and the energy management of EVs have been studied separately for years, and there still exists theoretical challenges in the system design due to the complexity of vehicle dynamics. To overcome this obstacle, this study is to establish a framework to design the energy management system (EMS) for EVs driven by multi motors. The proposed EMS is to simultaneously achieve the global objective of minimizing energy consumption, and the local objective of improving the safe traction at each local driving wheel. To this end, this study develops a system configuration to integrate the motion control with the energy optimization. Advanced control theories are applied (i) to reduce the complexity of system design and analysis; (ii) to guarantee system stability and robust stability; and (iii) to consider a possible trade-off between the global and local objectives. This study also aims to design an energy optimization algorithm that can allocate not only the torque distribution ratios but also the flux currents of the motors. The effectiveness of the proposed EMS is evaluated by both simulations and experiments.