

博士課程教育リーディングプログラム 平成 30 年度リーディング特別セミナー

System Dynamic Methods for Optimization in Electric Vehicles

聴講
自由

**Prof. Oliver Sawodny,
Institute for System Dynamics, University of Stuttgart, Germany**

Abstract:

The powertrain of an all-electric vehicle has changed radically compared to a conventional combustion vehicle. With this change new challenges but also new possibilities arise in terms of system integration and system control. Even though battery technologies continuously improve in capacity and price, one of the main challenges and customer concerns is the overall range. Consequently, founding is mostly directed to research in the field of battery capacity and battery management. However, several essential questions seek to improve the all-electric range by means of advanced driver assistant systems. Research activities at the Institute for System Dynamics thus focus on operating as well as energy management strategies for electric powertrain architectures based on software solutions and the consideration of additional environmental data. Latter is obtained from a constantly increasing number of vehicle sensors and increasing vehicle connectivity and is used for example in loss minimizing control strategies of electric drive modules ore in cycle and driver specific range predictions. In this context, estimating and optimizing battery lifetime is also essential for energy management. In most automotive applications, the battery can be represented by an electrical equivalent circuit. Lifetime effects are covered by adding empirical aging relations. Li-ion cell measurements are therefore essential and aging tests are exemplarily described for a LiMn2O4 cell. Based on the derived models, an optimization framework for battery lifetime extension is described for a given scenario. As last aspect the thermal management in EV's is discussed. Therefore, model-based approaches to describe the thermal circuits are introduced and methods to optimize the operational strategy and the design presented.

Biography:

Professor Sawodny received his Dipl.-Ing. degree in electrical engineering from the University of Karlsruhe, Karlsruhe, Germany, in 1991 and his Ph.D. degree from the University of Ulm, Ulm, Germany, in 1996. In 2002, he became a Full Professor at the Technical University of Ilmenau, Ilmenau, Germany. Since 2005, he has been the Director of the Institute for System Dynamics, University of Stuttgart, Stuttgart, Germany. His current research interests include methods of differential geometry, trajectory generation, and applications to mechatronic systems. He received important paper awards in major control application journals such as Control Engineering Practice Paper Prize (IFAC, 2005) and IEEE Transaction on Control System Technology Outstanding Paper Award (2013). He is a senior member of IEEE and senior editor of Mechatronics.



日時：平成 31 年 1 月 21 日（月）13：10～14：30

会場：豊橋技術科学大学 D 棟 4 階 D-412 室

問合先：リーディング大学院教育推進機構

leading@office.tut.ac.jp 0532-44-1028

担当：1 系 内山