IFAC World Congress 2017
open invited track on
"Powertrain systems: modeling, control and optimization"

Simona Onori, Clemson University, sonori@clemson.edu (Chair, IEEE CSS TC on Automotive Control)
Lars Eriksson, Linköpings Universitet, larer@isy.liu.se (Chair, IFAC TC on Automotive Control)

The automotive industry is striving to reduce the engine fuel consumption and emissions in response to the more and more stringent government mandates and customers demand for fuel efficient vehicles. The vehicles in use today are predominantly powered by Internal combustions engines, but more hybrid electric vehicles, extended range and full electric vehicles are being seen on the road. The penetration of these new technologies helps improve energy diversity, which adds security and leads to cleaner utilization of energy.

One of the main challenges currently faced by control engineers is the lack of availability of control-oriented models that can be used to carry out the control and/or optimization design making the modeling and simulation an integral part of the control design phase. Therefore, the development of control-oriented models and their use in model-based optimization and control design tools is critical to ensure that the potential of new engine design concepts can be exploited in full, ultimately resulting into improved fuel economy and reduced emissions. The challenge is to economically meet these regulations without compromising on customer satisfaction.

These control challenges include optimizing the use of existing hardware by applying advanced model-based control techniques and by taking advantage of new actuation and sensing capabilities. The objective of this open invited track is to gather representatives from academia and industry to share and discuss ideas on the state of the art, novel theoretical approaches, within the area of modeling, control, and optimization of powertrain systems and components. To this extent, we expect this invited open track to attract contributions in the field of modeling, design, optimization, estimation, diagnostics, with applications to automotive and transportation systems, such as: Engine/Powertrain Systems, Exhaust Emission Aftertreatment Systems, Alternative Fuels/Advanced Combustion Modes, Energy Conversion, Waste Heat Recovery, Hybrid Propulsion, and Energy Storage Systems. It is expected that this session will generate interest in expert researchers already working in these areas, as well as practicing controls engineers looking for new applications and novice students/professionals seeking to increase their understanding of modeling automotive systems for control design.

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