Cyber-Physical Test Benches for Model-Based System Testing of Electric Motors

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Model-Based System Testing (MBST), the combination of physical prototype testing and computer simulation of virtual elements, is emerging as an enabling technology in the automotive industry [1]. Cyber-physical test benches are one of its main applications, in which the component under assessment is interfaced to a virtual ecosystem that represents the rest of the vehicle and its environment. The correct and reliable operation of cyber-physical benches requires the coordinated interaction of real-time simulation, together with data management and fusion strategies, in a hybrid co-simulation setup.
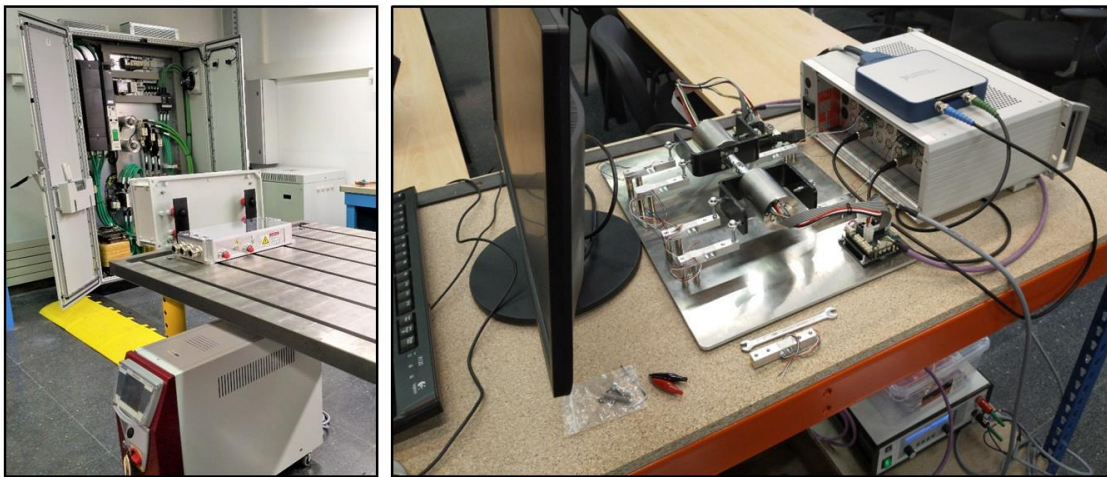

Figure 1: MBST bench for electric motors (left) and scaled prototype (right).

The research team at LIM has designed and built a back-to-back cyber-physical test-bench (Fig. 1) for motors in e-powertrains, with the aim to identify and address implementation issues in the real-time co-simulation and data management of these devices.

[1] R. Pastorino, Model-Based System Testing as Enabling Technology for Model-Based Product Development, Keynote Lecture, ASME IDETC-CIE, Online Conference (2020).