Hardware in the Loop Platform for Virtual Commissioning: Case Study of a Hydraulic-Press Model Simulated in Real-Time

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Abstract : Hydraulic-press commissioning consumes a great amount of man-hours, due to the fact that it takes place several miles away from where it has been designed. This factor became exacerbated due to control designers' lack of knowledge about which will be the final controller gains before they start working with it. Virtual commissioning has been postulated as an optimal solution to deal with this lack of knowledge. Here, a case study is presented in which a controller is set up against a real-time model based on a hydraulic-press. The press model is designed following manufacturer specifications and it is embedded in a real-time simulator. This methodology ensures that the model achieves similar responses as the real machine that would be placed on the industry. A deterministic communication protocol is in charge of the bidirectional information transmission between the real-time model and the controller. This platform allows the engineer to test and verify the final control responses with exactly the same hardware that is going to be installed in the hydraulic-press, in other words, realize a virtual commissioning of the electro-hydraulic actuator. The Hardware in the Loop (HiL) platform validates in laboratory conditions and harmless for the machine the control algorithms designed, which allows embedding them afterwards in the industrial environment without further modifications.

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