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Analytical Joining Models for Learning Contact-Rich Cabinet Assembly Tasks from Simulation

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Abstract

Recent advances in Machine Learning introduce promising solutions for the so-called intelligent automation. Learning robot control offline in a physics simulation environment presents one suitable approach, even for complex assembly tasks with high variance in the products to be manufactured. Beside the continuous development and improvement of efficient learning algorithms, the synthetically generation of feasible training data is of crucial importance. Therefore, this paper focuses on defining and evaluating analytical process models for the assembly of electrical cabinet terminals. Using the geometric and material product data, the predicted assembly forces are described mathematically as a function of the joining path. The presented work covers the development, evaluation and validation of accurate joining models for snap hook-based assembly which in a subsequent step can be implemented in any suitable state of the art physics simulation.

Keywords: Joining Models; Snap hook; Assembly Automation