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Integration of robotic systems in a packaging machine: A tool for design and simulation of efficient motion trajectories

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[L. Biagiotti](#) ; [C. Melchiorri](#) ; [M. Pilati](#) ; [G. Mazzuchetti](#) ; [G. Collepalambo](#) ; [P. Ragazzini](#)[View All Authors](#)**Abstract**[Authors](#)[Figures](#)[References](#)[Citations](#)[Keywords](#)[Metrics](#)[Media](#)

Abstract:

In this paper, the advantages of CACSD (Computer Aided Control System Design) tools for integrating a robotic system in a packaging machine are illustrated. Beside the mechanical integration of the robot into the machine architecture, it is necessary a functional integration, that requires a precise synchronization with the other parts of the system. In the proposed application, a robot with a parallel kinematics is used for pick-and-place tasks between two conveyor belts. It is therefore necessary a proper motion planning which allows to synchronize the grasp and release phases with the conveyor belts, avoiding obstacles and guaranteeing the compliance with bounds on velocity, acceleration and limits in the workspace. A trajectory composed by quintic polynomials has been considered and a specific tool has been designed in the Matlab environment, which allows to modify the parameters of the trajectory and to analyze the obtained motion profiles from both the kinematic and dynamic point of view.

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