
Industrial Delta Robot Control

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Abstract

An industrial Master Thesis performed at Asyрил SA treating the redesign of a Delta robot.

In a first part the Pocket Delta robot is identified and its principle characteristics are determined. Certain strengths and weaknesses of the system are highlighted, such as the low eigenfrequency of the system and the dead time in the control loop.

The rest of the report treats the design and creation of a prototype for a newer version of the robot. Two different dynamical models for the robot are established and compared, one based on a non-analytical approach, the other is an analytical model. The analytical model is favoured and on its basis a feed forward element for the controller is designed. Based on the findings of the identification and the establishment of the models an ideal new control strategy is devised. After the physical realisation of the prototype the new controller is implemented and compared to the previous solution.

The prototype significantly outperforms the Pocket Delta robot in its current configuration. With the new trajectory planner and the modification in the control strategy it realizes pick-and-place movements at considerably lower cycle times and significantly higher precision.