

Identification of mechanical manipulators

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Identification of mechanical manipulators

Authors: Ir. M.J.G. van de Molengraft, Eindhoven University of Technology
Dr.ir. F.E. Veldpaus, Eindhoven University of Technology
Prof.dr.ir. J.J. Kok, Eindhoven University of Technology

Abstract

Many mechanical manipulators are intended to move an object along a prescribed trajectory within a required accuracy. For this purpose often a close-working control of the manipulator is needed. The control functions better, if more knowledge about the manipulator is implemented, especially the dynamic behaviour in the form of a mathematical model. In such a model a number of variables and parameters plays a role. Model hypotheses, combined with physical laws lead to a set of so-called equations of motion. Next, the model parameters should be quantitatively determined. This can be achieved by system identification, i.e. determining the unknown parameters by relating the model to measurements on the manipulator. Assumptions with respect to the measurements result in a so-called measurement model. Together with the equations of motion this forms the a priori knowledge, that can be used for identification.

In this lecture an identification technique is discussed, which is based on the least-squares method. Applied to non-linear models it seems suited for off-line identification (smoothing). Beside this, a linear variant is considered which may be useful for on-line application (filtering).