

Dynamic simulation of industrial robots using the null space method

bachelor/project/master thesis

Industrial robots are used for many tasks, such as welding, varnishing and general pick and place operations. In order to plan and control the motion of these machines, efficient simulation techniques are needed. It is the goal of this thesis to implement a dynamic simulation based on the null space method and to compare its efficiency with respect to other approaches.



source: <https://new.abb.com/products/robotics/de/industrieroboter> (03.11.22)

The main idea of the null space method is to describe the robot in redundant coordinates and then reduce the number of unknowns by using a null space matrix to project the constraint forces out of the equations. By that, a reduction of the computation time may be achieved. Hence, the main tasks of this project are the implementation of the equations of motion in redundant coordinates, the structured assembly of the null space matrix and the simulation of the reduced equations of motion.

requirements

- “multibody dynamics” or “computational multibody dynamics”
- basic programming skills in e.g. Python or Matlab

contact

If interested, please send an E-mail to: Dr.-Ing. Giuseppe Capobianco, giuseppe.capobianco@fau.de