



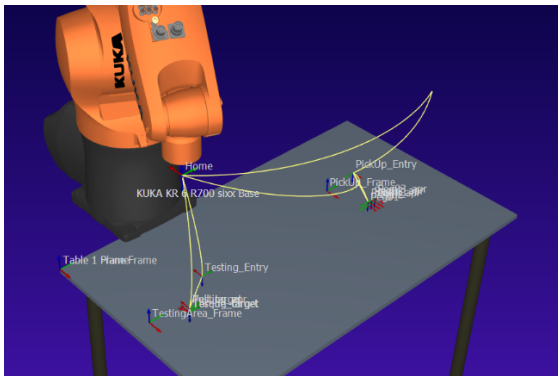
INDUSTRY CASE

#06_LEGO_A

Collision-free manipulator motion optimization (simulation)

Case description

Automation of the many steps from element production to packaging is central in the LEGO Factory. In some stations, robot arms must swiftly move along a sequence of target poses while avoiding collisions with the stationary obstacles in the station. Planning and optimizing motions along such pose sequences has a significant impact on cycle time and reliability of robot operations.



Motion planning along a pose sequence – here without obstacles

Challenge

Develop a simulation that can support the planning and optimization of collision-free motion sequences for robot arms.

To get the team started, consider the following:

- Which are the relevant optimization parameters (e.g. distance to obstacles)?
- Which are the relevant performance indicators (e.g. cycle time)?

Keywords: Motion planning, kinematic simulation, cycle time

Tools, methods and materials

The challenge can be addressed with any 3D simulation tool allowing for kinematic simulation. Regarding the methods, path and motion planner libraries such as Open Motion Planning Library are the typical reference implementations for this type of problem. The selection of tools and methods is left to the team. (Henrik)

From the LEGO Group, the team will receive 3D CAD data of a station with a robot arm, a sequence of target waypoints and specification sheets for the robot arm. In addition, engineers from the LEGO Group will be available to discuss details of the challenge along the way.

Contact

Jens Lomholt Frandsen - jens.frandsen@LEGO.com



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