RobotWorks

CAT - Computer Aided Teaching

Situation

- The use of robots is increasing by the day because they are very flexible and easily adaptable to different jobs. Deburring, polishing, gluing, dispensing, cutting, drilling and grinding are just a few examples of jobs which use robots today. Even some CNC-jobs can be done with a robot.
- Robots are perfect for work with complex parts and they guarantee, even with a small series, increases in productivity. Still, often the use of robots fails because:
- The Teach-In with the robot and standard off-line program systems, especially with complex parts, are very expensive and labour intensive
- Standard off-line program systems are expensive and difficult to use
- The robot is not productive while it is being used for Teach-In
- Changes to the path are difficult and time consuming

Solution

RobotWorks is fully integrated into the 3D-CAD System SolidWorks, and quickly creates the desired path direct from 3D models. Using IGES, VDAFS, STEP and other built-in formats it can import data from CAD systems like Inventor®, Unigraphics®, Pro/E®, CATIA® etc. Within minutes RobotWorks lets you know if the robot can reach all the path points collision-free. Only a few mouse clicks are needed to check alternative path solutions.

RobotWorks uses the user-selected faces and edges to create the points for the robot path. Saved tools and robot parameters let you easily define the environment and will help to create the path very quickly. The motion on screen shows the user when a path needs to be altered due to collision or reach problems. RobotWorks provides the user with handy tools to adjust and correct the path with only a few mouse clicks.

Because of the integration of RobotWorks into SolidWorks the robot path becomes part of the cell design. This way, any changes to the robot cell, i.e. collision, will immediately update the models and drawings – ready to be manufactured!

RobotWorks also can easily handle the tough job of moving parts. The more complex the part and path, the more benefit the user will get by using RobotWorks.

Tip

RobotWorks is also very efficient for cases in which only a reach study is needed, or the cell layout and the position of the part to be manufactured has to be defined. Also, it's easy to decide which robot can do the job!











Applications



People in production only rely on success stories, not on theory! That's why we show you some examples:

Welding with a rotary table

Most kitchen refrigerators and air conditioners have a built-in compressor. One of the final steps of production is elaborated welding. This is used in order to enclose all the internal parts to form a hermetically sealed unit.

Not only do compressor housings have strange 3D shapes, but their welding must be continuous so that the sealing will be perfect. This process calls for moving the part in space **in coordinated motion** with the welding



torch. However, programming robots to do this job is far from simple. A programming job like this may take many hours, even days!

With RobotWorks first the path will be created in minutes following the geometry. Then the motion of the rotary table will be added and checked

on screen to optimize the path. It needs only a few more mouse clicks to send the program to the robot - the whole Teach-In process takes less then 30 minutes.

Polishing of faucets

Because of the complex shapes and faces of faucets, in many cases they are polished by hand. This way of manufacturing is far too hard, noisy and dirty, so a robot may be considered. But to Teach-In the old fashioned way may take days and is very complicated, because the robot is to move the faucet on a **fixed** polishing



brush or tape.

RobotWorks will speed up that process dramatically and will make it simple too. The path will be sketched on the 3D model. While it is still a parametric path it may be changed and optimized in seconds. That's how complex shapes can now be handled by a robot.

Well known companies already have saved time and otherwise benefited using RobotWorks with applications for grinding tur-bine blades, deburring casting parts and planning complex robot cells.

Features of RobotWorks

- Supports most 6-axis robots
- Export of point data in many formats
- Writes direct programs for Fanuc, ABB, Kawasaki, ABB, Motoman, Kuka and Stäubli – with more to come
- Import of exitisting robot path possible
- Immediate calculation of reach and joint limits, immediate display of any problems
- Replacement of a robot in a cell with a mouse click
- Selection of the path by faces, edges and mid air points
- Teach-In through external digitizers like Microscribe and FARO, capturing the hand motion directly (CopyCAT)
- User can define the motion parameters of the robot
- Moving part or moving tool
- Collision check
- Simple tools to support part and cell calibration
- Motion in mid air is easy to define
- Any complex geometry can be selected as a path
- Interfaces to most CAD systems is included in SolidWorks
- Joint limits are checked, "close to" is shown
- Display of joint values at each path point
- Import of externally created path points
- Import of existing robot programs like SRC, LS, JBI, PRG (optional, restrictions may apply)
- Change of the path through offsets and soft transition like sine wave, linear etc.
- User can modify the path at any level
- Change of the robot cell or the position of the tool / part and even the robot itself is done very easily
- Path manager helps to get easy overlook over the path
- Addition of user defined events to every path point (laser on, close gripper etc...)
- Event editor included
- The program is easy to use and learn
- Very profitable investment RobotWorks may pay off with the firstTeach-In job
- RobotWorks is in English and comes with an outstanding help and tutorials. (other languages available).

Rotary table

For welding applications or pipe cutting, an addon module is available which supports the use of a rotary table and two-axes positioner. RobotWorks makes sure that a perfect tool orientation and position is always kept. Also there are special features to cut contours in pipes. The module is made in such a way that every user can easily design his own rotary table or positioner and use it within RobotWorks.

Import of CNC data

RobotWorks can import 3 & 5-axis CNC programs and convert them into a real robot program. So a flexible and fast robot can replace a very expensive portal milling machine for the milling of plastic or wooden parts. Customization for more formats is available upon request.

Real-time connection

RobotWorks can connect over network to robot controller that can export real-time robot position, such as FANUC & Staubli. You can then compare the real path of the robot to the one in **Robot**Works. So reality can be optimized offline and online!

CopyCAT

CopyCAT is an inexpensive measuring tool used to collect the hand motion of a master, while painting, deburring or other hand-driven applications. The collected path can transferred immediately to the robot. There is no faster way for Teach-In a robot.

Ask for detailed information.



Robot path directly from a CAD model



