The DELTA Haptic Device

Why a DELTA structure?

STIFFER, LIGHTER, STRONGER

Robotic structures that display parallel kinematics (like the DELTA configuration) offer far better characteristics than standard serial configurations.

The 3-DOF DELTA structure can accept different grippers on its extremity. For example with an active wrist, the system becomes a 6 degree-of-freedom haptic device.

To improve sensitivity and decrease friction threshold, a 6-DOF force sensor can be added to the gripper. Such a version of the device is currently under evaluation.

Specifications

workspace translation cylinder $\varnothing$ 360 mm x 200 mm
rotation +/-20° for the three rotations
continuous force 20 N in the entire workspace
torque 0.2 Nm in the entire workspace
resolution linear < 0.1 mm
angular < 0.04°
sensitivity linear max 1/16 (without 6-DOF force sensor)
angular max 1/5 (without 6-DOF force sensor)
software Windows API
system requirements Pentium 300MHz or equivalent

6 degree-of-freedom haptic applications

micro & nano technology
- manipulation under microscope
- manipulation planning
- interaction with an AFM
- carbon nanotube manipulation

medical applications
- surgery simulators
- teaching and training
- active & intelligent tool holder
- preoperative planning
- augmented reality surgery

simulation
- virtual environment with 6-DOF haptic device
- real-time rigid/dynamic body simulation
- fusion with active vision systems

teleoperation
- teleoperation in hazardous environment
- immersive remote driving & haptic GUI
- haptic sensing of obstacles

Partners

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