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A Systematic Load Identification Procedure for Parallel Robot Manipulators

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This paper presents a systematic load identification procedure for a class of parallel robot manipulators. It is considered as a regular dynamic robot identification problem since the load is rigidly fixed on the robot-platform. The estimation scheme uses the fact that the equations of motion are linear respect to the inertia parameters and the gravity term. Starting from the equations of motion of a rigid body, two identification equations are derived. The challenge is that the estimation must be based only on the measurements obtained through sensors at the actuators. No additional force-torque sensors mounted on the robot-platform are available. On this account we make use of the well-known kinematic relations and differential equations to transform the forces, positions and velocities of the actuators in torques represented in body fixed frame. The load identification procedure is exemplified by experimental studies with a calibrated test load based on periodic robot excitation.

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