

Sensorless Friction and Gravity Compensation

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In this video we present a new controller for robots, called Zero-Friction Zero-Gravity control. The controllers combine terms for compensating the forces exerted by gravity, and the forces of friction of motors and reductions. The consequence of applying this control to a robot (a humanoid robot arm in this case) result in a free movement, as if the robot were floating in space. Only the inertia drives the movements by zeroing the forces of friction and gravity. This control, when applied to an adequate robotic platform, could allow to simulate gravity free conditions of movement. A slightly different version of this controller, namely Low-Friction Zero-Gravity control, allows new forms of human-robot interaction. This controller introduces an attenuation variable for the friction compensation term, which makes a smooth and easy interaction with the robot possible, whose movement eventually stops due to the low friction. Experiments are performed using 1 DoF of an arm of the humanoid robot Teo.

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