

Controllo di robot sottoattuati – Control of underactuated robots

Under-actuated Robots have a simpler architecture than fully actuated ones and employ a number of actuators smaller than the degrees of freedom (DoFs) of the end-effector (EE) that they control. Therefore, the EE is under-constrained and preserves some freedoms, even in case all actuators are locked, which may lead to undesirable oscillations. In order to plan control actions for an Under-actuated Robot, it is necessary to take into account EE dynamics, whose parameters may be time-varying (e.g. the EE center of mass changes when picking an object). In addition, the deficiency in actuators makes it impossible to use standard direct kinematics algorithms for pose computation. The aim of this research is to implement on a Under-actuated Robot an adaptive-control strategy, which is able to estimate in real-time the changes in EE dynamics parameters, alongside a robust state estimator, which is necessary for the determination of EE pose in case of actuator deficiency.