

Polynomial tools for robotics

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In this talk, I will describe our latest formulations and experimental results using polynomial optimization to analyze, design, and control dynamic robots. In particular, I'll describe our initial progress in analysis of rigid body systems with frictional contact (and inelastic collisions), which can be formulated nicely using the language of measure differential inclusions - as opposed to hybrid systems - yielding a smooth optimization over a semi-algebraic set. I will attempt to articulate some of the "pain points" where we still struggle to get meaningful answers out of the numerical solvers, and will share a MATLAB toolbox that we've written to make these formulations accessible to anybody who is interested in playing with them.