DESIGN AND SIMULATION OF ROBOTIC MANIPULATORS DRIVEN BY PNEUMATIC ARTIFICIAL MUSCLES USING SLIDING MODE CONTROL

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Robotic manipulators are increasingly being utilized in applications that require interaction with human. In order to enable safe physical human robot interaction, light weight and compliant manipulation are desirable. These requirements are problematic for many conventional actuation systems, which are often heavy and typically use high stiffness to achieve high performance, leading to large impact forces upon collision. Pneumatic Artificial Muscles (PAMs) exhibit these characteristics and are capable of higher specific work than comparably sized hydraulic actuators and electric motors. However control PAM- actuated systems are proven difficult due to the highly nonlinear nature of the actuators and pneumatic systems driving their actuation. In this project, PID control strategy containing a distinct level of priory model knowledge, was designed to enable motion tracking of the single degree of freedom PAM actuated manipulator. Even though it tracks the path, it shows overshoot and to reduce that a sliding mode control is designed.

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