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Design and Evaluation of a Pneumatic Muscle Actuated Gripper

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Abstract : Deployment of pneumatic muscles in various industrial applications is still in its early days, considering the relative newness of these components. The field of robotics holds particular future potential for pneumatic muscles, especially in view of their specific behaviour known as compliance. The paper presents and discusses an innovative constructive solution for a gripper system mountable on an industrial robot, based on actuation by a linear pneumatic muscle and transmission of motion by gear and rack mechanism. The structural, operational and constructive models of the new gripper are presented, along with some of the experimental results obtained subsequently to the testing of a prototype. Further presented are two control variants of the gripper system, one by means of a 3/2-way fast-switching solenoid valve, the other by means of a proportional pressure regulator. Advantages and disadvantages are discussed for both variants.

Keywords : gripper system, pneumatic muscle, structural modelling, robotics
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