Industrial Robot Permanent Magnet Synchronous Motor (PMSM) Application and Simulation

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Keywords—Instrial Robot, PMSM, Motor, Simulation, Python, Jupyter notebook

## Introduction

In the realm of robotics, the efficacy and precision of robotic systems hinge on the quality and performance of their constituent components. Among these, the motor plays a pivotal role as the prime mover, enabling motion control and manipulation. Permanent Magnet Synchronous Motors (PMSMs) have emerged as a popular choice in the field of robotics due to their exceptional efficiency, precise control, and high power density. These motors utilize permanent magnets to generate magnetic fields, ensuring synchronous rotation between the stator and rotor, which makes them an ideal candidate for applications where precision and reliability are paramount.

This research endeavors to develop a model of a PMSM motor that can be integrated into a robot's control system for simulation and real-world applications. The aim is to investigate the intricacies of PMSM behavior, control strategies, and their application in various robotic tasks. Such a model not only aids in a comprehensive understanding of PMSM motor dynamics but also serves as a valuable tool for optimizing the performance of robotic systems.

In this report, we will provide an overview of the importance of PMSM motors in robotics, outline the key characteristics that make them desirable for robotic applications, and discuss the relevance of modeling these motors for simulation purposes.

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##### References

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