

Cover Letter

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Editor-in-Chief
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Dear Editor,

I am pleased to submit our manuscript titled "**Enhancing Industrial Robot Motion Planning with Hybrid Trajectory Methods and Quaternion Representation**" for consideration for publication in the Journal of Control Engineering and Applied Informatics. This work addresses significant challenges in industrial robotic motion planning by integrating hybrid trajectory methods, namely Linear-SLERP, B-Spline, and Bezier curves, with quaternion representation to enhance motion smoothness, efficiency, and control.

The manuscript presents a novel hybrid approach that combines the strengths of each trajectory method, optimizing for smoothness and control, thereby minimizing mechanical stress and improving overall motion efficiency. The proposed method has been implemented and validated using the CoppeliaSim simulation platform with a 7-DoF Franka Emika Panda robotic arm performing a standard pick-and-place task. The results demonstrate significant improvements in trajectory smoothness, reducing average velocity, acceleration, and jerk compared to traditional trajectory methods.

We believe that our findings offer a valuable contribution to the field of control engineering and applied informatics, particularly in the context of industrial robotics. The key highlights of our research include:

- A comprehensive comparative analysis of trajectory planning methods.
- Integration of quaternion representation to avoid gimbal lock and enhance orientation robustness.
- Demonstrate the superior performance of the hybrid method in achieving smooth and efficient robotic motion.

We affirm that this manuscript is original, has not been published previously, and is not under consideration for publication elsewhere. All authors have approved the manuscript and agree with its submission to the Journal of Control Engineering and Applied Informatics.

We appreciate your consideration of our manuscript and look forward to the possibility of contributing to your esteemed journal.

Sincerely,

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