

# Frequency Sweeping Technique and Stability Analysis of Multi-Agent Systems with Communication and Input Delays

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## **Abstract:**

The proposed doctoral research focuses on the exploration of advanced control techniques in the realm of multi-agent systems with communication and/or input delays. Specifically, the study aims to develop innovative methodologies for frequency sweeping and stability analysis of multi-agent systems. The core problem lies in understanding the intricate interplay between communication delays, input delays, and the stability of multi-agent systems from the frequency domain. To tackle this challenge, the research endeavor necessitates a comprehensive literature review, computational simulations, and theoretical analyses. The prospective doctoral student will be tasked with exploring cutting-edge algorithms, conducting rigorous stability analyses, and devising efficient frequency-sweeping techniques. Furthermore, the research aims to establish practical applications in diverse fields such as autonomous robotics, swarm intelligence, and networked control systems. The outcomes of this doctoral thesis are anticipated to significantly enhance our understanding of delayed multi-agent systems, paving the way for advancements in real-world applications.

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