A Novel Gait Controller Method for More Stable Operation of Complex Legged Systems

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This project presents a novel gait controller method, which generates real-time dynamic responses to efficiently operate complex legged systems. The proposed method uses a stance-swing proportional control approach, where the step trajectory is separated, and the stance and swing phases are proportioned to allow the robot to hold its center of mass (COM) on the four legs for a short and adjustable period of time. To determine the initial proportion, IMU output graphs are visualized, and a PID loop is then implemented to provide logical feedback and eliminate errors caused by environmental conditions. The system is tested in two stages: first, in a real-time physics simulator to examine the system's behaviors, and second, in the real-world to investigate the effects of different parameters on the prototype's operating state. The results demonstrate a noticeable improvement in stability, which is attributed to the outputs produced by the proposed control method.

Awards Won:
King Abdulaziz &amp
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