

## **Impedance control approach on leg motion speed variation on soft surface interaction**

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### **ABSTRACT**

This article presents the leg speed variation control using impedance control approach on soft surface displacement motion. One of the challenging fields of designing a legged robot that can be equipped with adaptation ability is its dynamic control which is majorly involved in interaction with the environment. Numerous researchers have been widely implemented impedance control as dynamic interaction but less emphasized in adapting soft terrain. Most of the impedance control implementation on the legged robot on rough terrain emphasized on position changes, and it may not be practical for a legged robot to navigate on soft terrain. Soft terrain contains different ground stiffness and medium viscosities. Thus, this study has taken the initiative to propose a speed variation control on a robot's leg by using a force-based impedance control approach to increase the leg energy exchanges specifically on foot placement. The proposed control was validated in an actual robot's leg, and performances show that the energy in the leg increases as the velocity of leg motion increases due to an increase in force feedback while maintaining the shape of the leg motion.

### **KEYWORDS:**

Energy; Impedance Control; Legged Robot; Mobile Robot; Speed Variation of Motion.