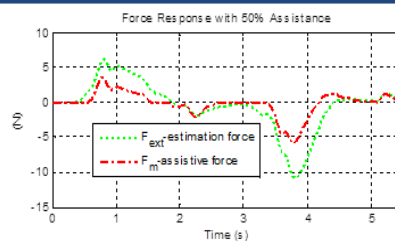


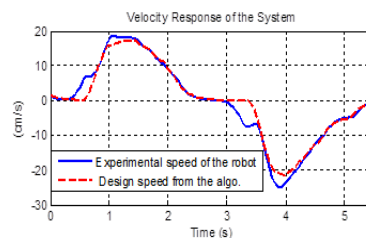
Assistive Force and Velocity Design for a Walking Helper Based on Force Sensorless Approach

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An important perspective for assistive robotic technology is to help people in walking, rehabilitation or object moving in daily life activities. External force estimation is crucial for a robot helper to infer the user's motion intent and interact compliantly to user's motion. This paper presents a novel scheme to generate force compensation in compliant to the velocity of a user. The method is robust to the user's motion behavior and easy for tuning the compliance parameters. Furthermore, the proposed method not only adapts to user's velocity in assist behavior but also generates proper assistive force based on a force-sensorless approach. Experimental results show that the proposed approach enables a robot walk helper to handle various external force situations and adjusts the robot speed according to user's motion condition.



Force response with the estimated external force and assistive force of the system



Walking assistive experiment with force compensation.