

Design and Implementation of Multivariable Robust PID Control for an Active Gait Trainer

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Abstract

This paper applies multivariable robust PID control for an active gait trainer for people with walking disability. We integrate linkage mechanism and motors to construct an active gait trainer, which can produce preferred gait traces. First, we find the transfer function matrices of the gait trainer. Second, because robust control can deal with system uncertainties and disturbances, we design standard robust controllers to regulate motor motions during operation. Third, because PID control is well accepted in industrial, we combine the merits of robust control and PID control, and design robust PID controllers for the gait trainer. Lastly, the designed controllers are implemented on cRIOTM and micro-chip systems for experimental verification. The results show the effectiveness of these controllers.