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# Controller Design and Preliminary Testing of a Powered Below-Knee Prosthetic Device

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**Abstract**

A powered lower limb prosthesis, which consists of a four bar mechanism, a torsional spring and a brushed DC motor, was previously designed and fabricated. To regulate the motor power input, a two level controller was proposed and built. The control algorithm includes a higher level finite state controller and lower level PID controllers. A digital signal processor (DSP) control board and MATLAB Simulink are used to realize the higher level control and a DC motor controller is used to realize the lower level PID control. Controller Area Network (CAN) communication was used to communicate between the two level controllers. To preliminarily test if the motor can generate required power, a bench test was performed. The results show that the motor needs to be overpowered to achieve the required moment.

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