

Mechanical Engineering Thesis Defense

Design and Development of a Passive Prosthetic Ankle

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abstract

In this work, different passive prosthetic ankles are studied. It is observed that complicated designs increase the cost of production, but simple designs have limited functionality. A new design for a passive prosthetic ankle is presented that is simple to manufacture while having superior functionality. This prosthetic ankle design has two springs: one mimicking Achilles tendon and the other mimicking Anterior-Tibialis tendon. The dynamics of the prosthetic ankle is discussed and simulated using Working model 2D. The simulation results are used to optimize the springs stiffness. Two experiments are conducted using the developed ankle to verify the simulation. It is found that this novel ankle design is better than SACH foot. The experimental data is used to find the tendon and muscle activation forces of the subject wearing the prosthesis using OpenSim. A conclusion is included along with suggested future work.