

Modeling and Detailed design of the Hand Prosthesis Promanu.

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- **Author(s):** Loaiza B., Jair L.; Arzola, Nelson; Hernández B., Ruben D.
- **Abstract:** This paper presents the process of modeling and detailed design of the prosthetic hand Promanu. The kinematic model, generated by transformation matrices guarantees the six degrees of freedom required to achieve the common movements gripping and manipulating objects. Consist of rotating finger phalanges driven by wires during closing and during the opening by linear elastomer springs. The thumb has two degrees of freedom, facilitating the movement of opposition to the other fingers; the index finger has a degree of freedom and fingers another degree of freedom. The wrist has flexion- extension movement ($\pm 85^\circ$) using a kinematic pair consisting of a mini-motor. While forearm pronation has supination by rotation ($\pm 105^\circ$) of two moving parts driven by a mini-motor. To ensure conditions of strength and stiffness of the prosthesis develop dynamic simulations using the finite element method. The grips of a cylinder, a block and a small sphere are studied. The detailed design is evaluated by reviewing the kinematic and dynamic performance analysis of resistance and rigidity achieved, verifying the adequacy of the actuators, checking the conditions of understanding and other attributes set design by Quality function deployment (QFD). As a result, a functional prototype prosthetic hand is obtained using the technique of rapid prototyping, which meets the required design specifications and is projected as an attractive solution for amputee patients.
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