

Chapter 1: Mechatronics System Design

Problem 1:

What is Mechatronics? How is it different from the traditional approach of designing? State the advantage of using the mechatronic design methodology?

Solution:

Mechatronics is essentially a combination of several engineering and technological disciplines. Different than traditional methods of design, mechatronics design usually involves concurrent engineering rather than designing a mechanical system first, then figuring out how to design controls and electronics. The mechatronics design methodology is based on a concurrent, instead of sequential, approach to discipline design, resulting in products with more synergy. Mechatronics combines mechanical, electrical and computer engineering practices into a method that is useful for system optimization. Mechatronics design usually leads to a reliable and effective system. Mechatronics products exhibit performance characteristics that were previously difficult to achieve without the synergistic combination.



Figure Error! No text of specified style in document. Mechatronics key elements

Mechatronics is the result of applying information systems to physical systems. The physical system consists of mechanical, electrical, and computer systems as well as actuators, sensors, and real time interfacing. In some of the literature, this block is called an electromechanical system.

Mechatronics is really nothing but good design practice. The basic idea is to apply new controls to extract new levels of performance from a mechanical device. Sensors and actuators are used to transduce energy from high power, usually the mechanical side, to low power, the electrical and computer side. The block labeled mechanical systems frequently consists of more than just mechanical components and may include fluid, pneumatic, thermal, acoustic, chemical, and other disciplines as well.

Problem 2:

What is the function of a sensor and an actuator in a Mechatronic System? List different types of actuators with at least two examples of each type.

Mechatronics System Design Solutions Manual

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Mechatronics System Design Solutions Manual:

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