ELG3336: Midterm 2

Design of a Mechatronics System

Draw the block diagram and design each subsystem (Amplifier; Filter; Sample and Hold; ADC; DAC) and set up specifications of other subsystems (Sensor; Multiplexer; Microcontroller; Actuator).
Draw the circuit diagram and specify the specification of each subsystem! Subsystems that cannot be designed should be technically specified through search in the Internet and/or books.
(Maximum 10 pages)

Design a Mechatronics system (identify it) to sense 4 analog input signals and produce 4 analog outputs. The inputs come from sensors that produce low frequency signals but are known to pick up higher-frequency noise. These signals are to be measured to an accuracy of at least 1%. The output signals are to drive actuators with maximum operating bandwidth of 300 Hz, but which are affected by higher-frequency signals. The actuators require signals to an accuracy of at least 1%.

Case Study Procedure

- Identify the application of the proposed system and keep it as a title for your case study.
- Draw a block diagram of the entire system in the first page of your report.
- Allocate an independent section to each subsystem (for example, Section 1: Sensors; Section 2: Signal Conditioning; Section 3: Multiplexer; …).
- For each selected subsystem, provide the appropriate technical specifications and pictures using the Internet.
- For each designed subsystem, provide the circuit diagram(s), the required design criteria, and the details of design and calculations.
- Always be brief and provide technical information only. You are providing a technical report to others who are professionals and already know the subject.