ME 6102: Design of Mechatronic Systems

Selection of microprocessor

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Criteria for Selection of Microcontroller

- Number of sensors and actuators and corresponding interfaces
- Compatibility of voltages of sensors and microcontroller
- Bit resolution of interfaces needed
- Complexity of control and filter computation
- Sampling time:
  - Filters necessary for different computations ex. Derivative computation of PD control
  - Speed of computation and volume of computation
  - Speed of interfaces, for example A/D and D/A conversion
- Cost

More details discussed in class

Sampling time

- Depending on the processing speed (2MHz in XEP 100 for example) and computations involved the sampling time needs to be judiciously chosen
- Most microprocessors work with integer data type for variables at the root level. If you are using other types of variables unnecessarily, it may increase the computation load drastically
- Experience XEP 100 programming with float.
- Thus during programming one needs to be aware of this issue

Sampling time

- The sampling time would be chosen first based on the application speed required
- Then choice about microcontroller speed can be made properly by anticipating amount of computations involved
- Computations many times require signal processing which would be considered an additional computation load much more than computation of control law