DEPARTMENT OF MECHANICAL ENGINEERING
AND APPLIED MECHANICS

ME560
Modeling Dynamic Systems
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DEFINITIONS
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System: An entity separable from the rest of the universe by a physical or conceptual boundary.

Environment: All that is external to the system.

System Variable: A measurable characteristic of the system that may vary with space or time.

Input Variable: A system variable that is prescribed by the environment.

Output Variable: Formally, the co-power variable on a source is automatically assumed to be an output. For example, the flow (velocity) associated with an effort (force) source. However, it is often considered to be any system variable of interest. From a control system perspective, the output variable is considered to be the measured variable.

State Variables: The set of system variables required to define the system at any time t.

State Determined System: A system for which a set of state variables can be determined for all time, t > to given the values of the set at t = to and the values of all the system inputs for t > to.

Dynamic System: Mathematically, a system whose input/output behavior is time dependent. This occurs whenever two system variables are related by a time derivative.

Proper Model: A necessary yet sufficient complex model with physically meaningful variables and parameters.