# ME 419 Solar Tracking Panel Control Term Project

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**Class:** ME419

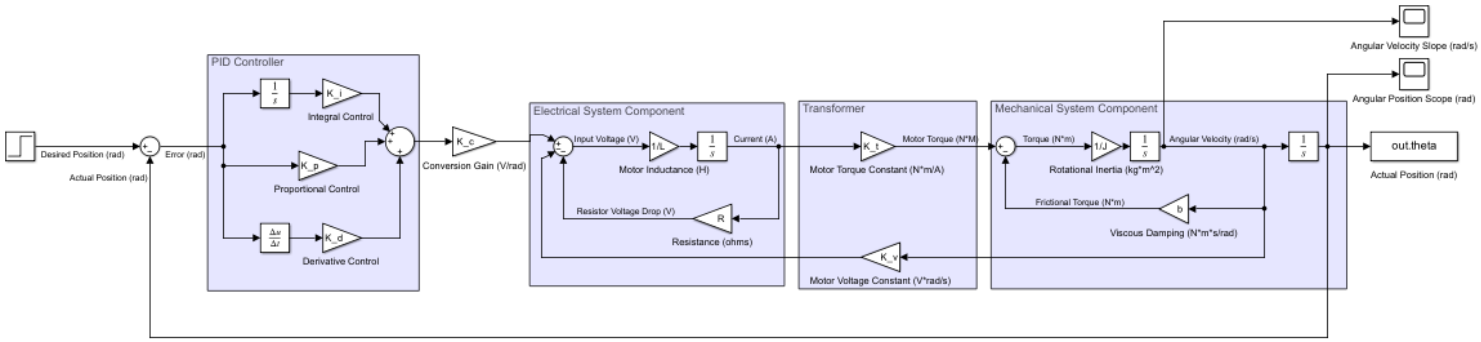
**Description:** The purpose of this file is to simulate the control of a solar tracking solar panel to compare to experimental behaviors found with testing.

## System Properties

```
% Integral control gain
K_i             = 10;                % [N/A]
% Proportional control gain
K_p             = 10;                % [N/A]
% Derivative control gain
K_d             = 100;                % [N/A]
% Visous damping coefficient
b               = 3.14e-7;          % [N*m*s/rad]
% Winding resistance
R               = 0.68;             % [Ω]
% Winding inductance
L               = 0.078e-3;         % [H]
% Rotor inertia
Jmotor          = 9.82e-7;          % [kg*m^2]
%Panel inertia
Jpanel          = 5;                % [kg*m^2]
%Total inertia
J               = Jmotor+Jpanel;    % [kg*m^2]
% Motor torque constant
K_t             = 14.6;           % [N*m/A]
% Motor voltage constant
K_v             = 14.6;           % [V*sec/rad]
% Theta to voltage constant
K_c             = 1;              % [V/rad]
```

## Block Diagram

```
snapshotModel('ME419TermProj') %output simulink image
```




## Simulation

```
%run simulation
run = sim('ME419TermProj.slx');
```

```
Warning: Solver is encountering difficulty in simulating model 'ME419TermProj' at time 1.0000000000000036.
Simulink will continue to simulate with warnings. Please check the model for errors.
Warning: Solver was unable to reduce the step size without violating minimum step size of 3.55271E-15 for 1
consecutive times at time 1.  Solver will continue simulation with the step size restricted to 3.55271E-15
and using an effective relative error tolerance of 0.265823, which is greater than the specified relative
error tolerance of 1E-09. This usually may be caused by the high stiffness of the system. Please check the
system or increase the solver Number of consecutive min steps violation parameter.
Simulation aborted
```

```
plot(run.tout,run.theta)
```