

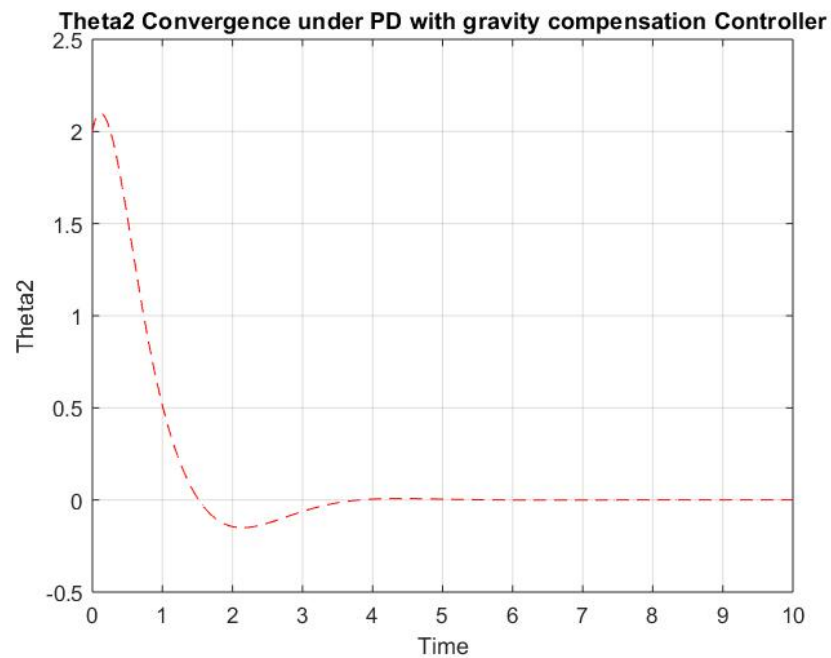
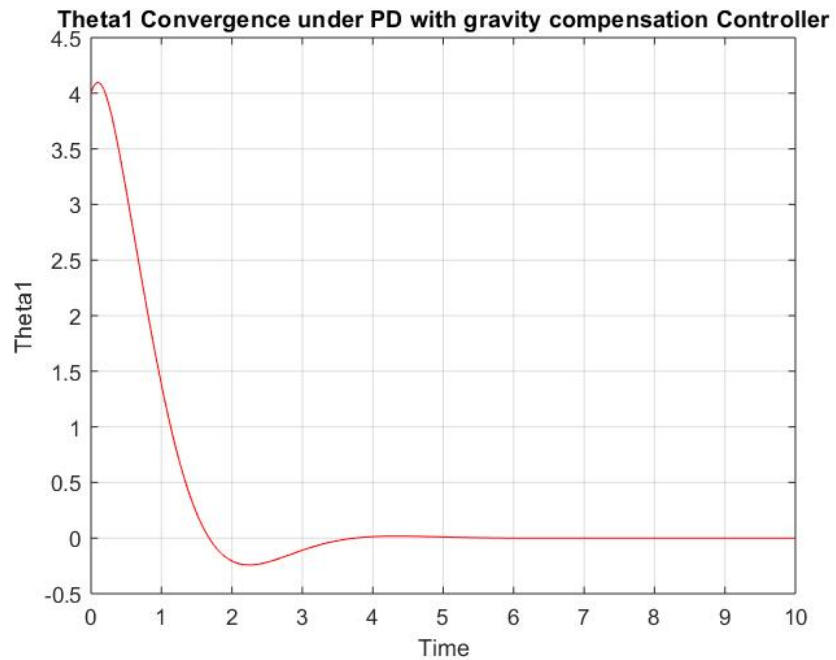
HW5-Results

Calvin He, Jakub Kaminski, Mostafa Atalla

Set Point Tracking Controllers:

PD controller with Gravity Compensation:

```
x0_s=[4, 2, 2, 2];           %initial conditions for the state vector  
xf_s=[0 0 0 0];             %final state for set point tracking control
```



HW5-Results

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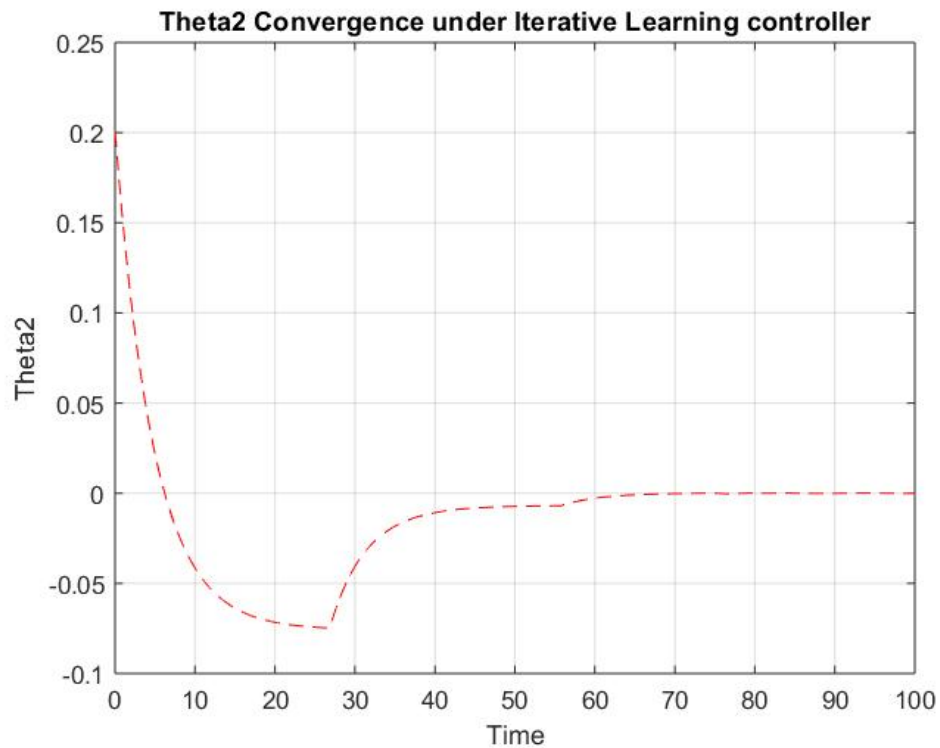
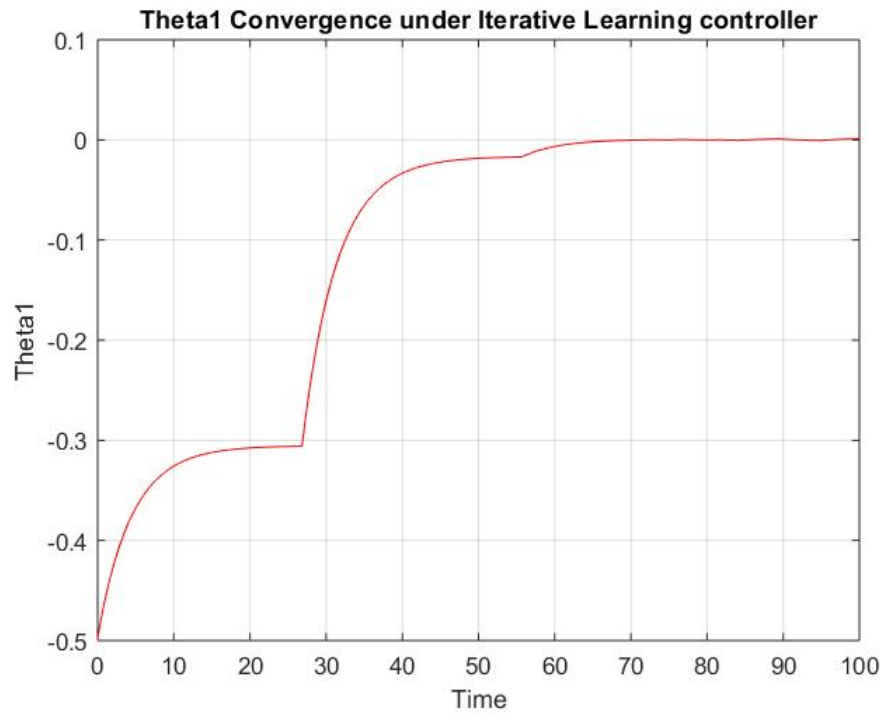
Iterative Learning Controller:

```
x0_i=[-0.5, 0.2, 0.1, 0.1];
```

```
%initial conditions for the state vector
```

```
xf_s=[0 0 0 0];
```

```
%final state for set point tracking control
```



HW5-Results

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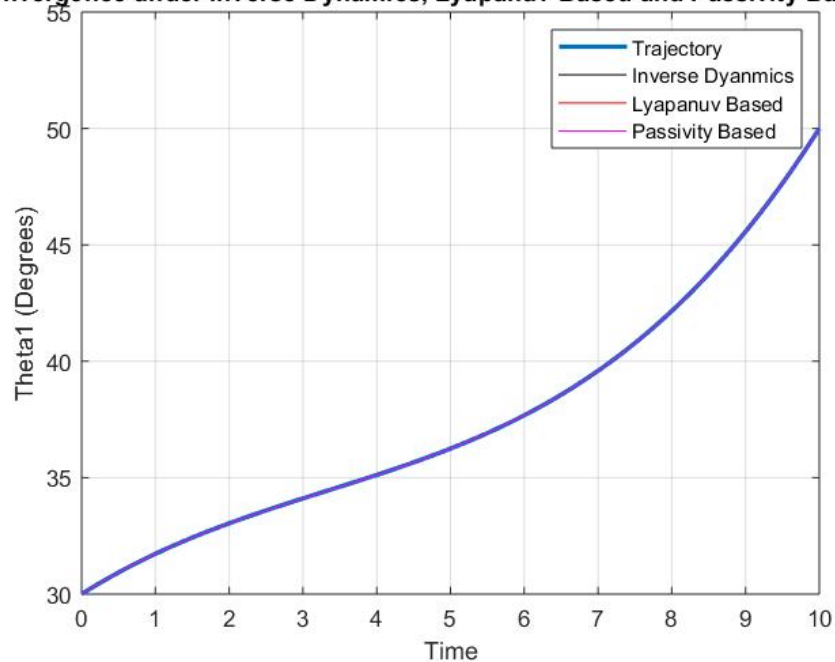
Tracking Controllers

Inverse Dynamics Controller, Lyapunov Based Controller and Passivity Based Controllers.

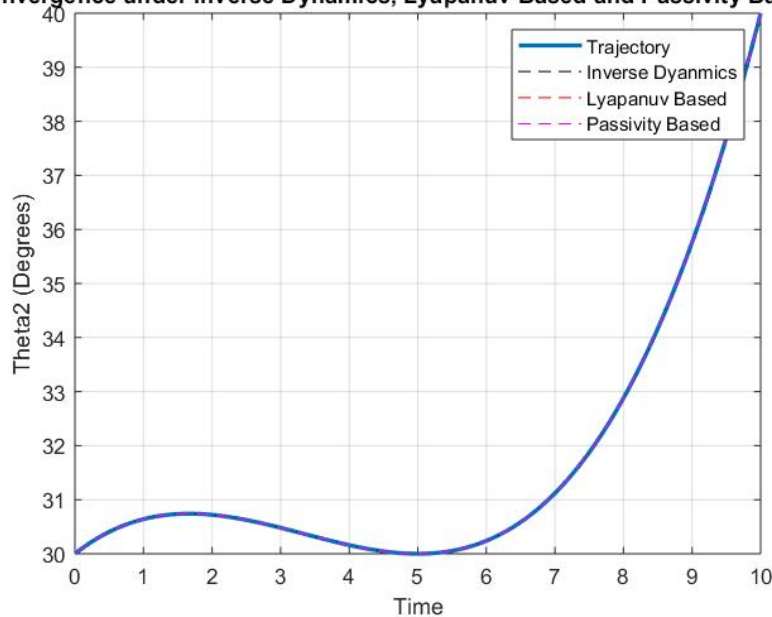
```
x0=[30 30 2 1]; %Setting initial conditions for the state vector
x0_traj=[30 30 2 1] %Initial condition for the trajectory (without initial error)
x0_traj_e=[5 1 0.3 0.1] %Initial condition for the trajectory (initial error)
xf = [50,40, 5, 5]; %Final state desired
```

Tracking Control without initial errors from the trajectory: The system response is exactly following the trajectory.

Convergence under Inverse Dynamics, Lyapunuv Based and Passivity Based C



Convergence under Inverse Dynamics, Lyapunuv Based and Passivity Based C

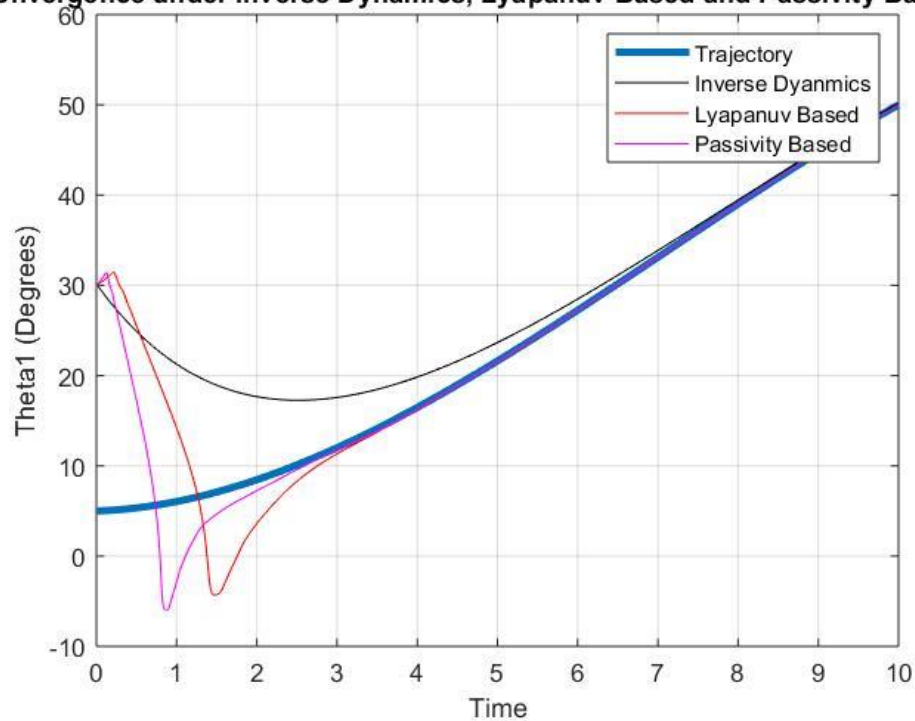


HW5-Results

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Tracking Control with initial errors from the trajectory: The system is converging under the 3 controllers as shown below.

Convergence under Inverse Dynamics, Lyapunov Based and Passivity Based Control



Convergence under Inverse Dynamics, Lyapunov Based and Passivity Based Control

