

# 11-30\_DS\_emech.mrpotatohead

November 30, 2021

```
[1]: import numpy as np
import matplotlib.pyplot as plt
%matplotlib inline
```

```
[2]: R = 2
L = 8e-3
Ka = 0.2
J2 = 0.1e-3
B2 = 50e-6
N = 5
J4 = 1e-3
B4 = 70e-6
```

```
[3]: A = np.array([[ -R/L, -Ka*N/L], [Ka*N/(J2*N**2 + J4), -(B2*N**2 + B4)/(J2*N**2 + J4)])
B = np.array([[1/L], [0]])
C = np.array([[0, N], [0, 1]])
D = np.array([[0], [0]])
```

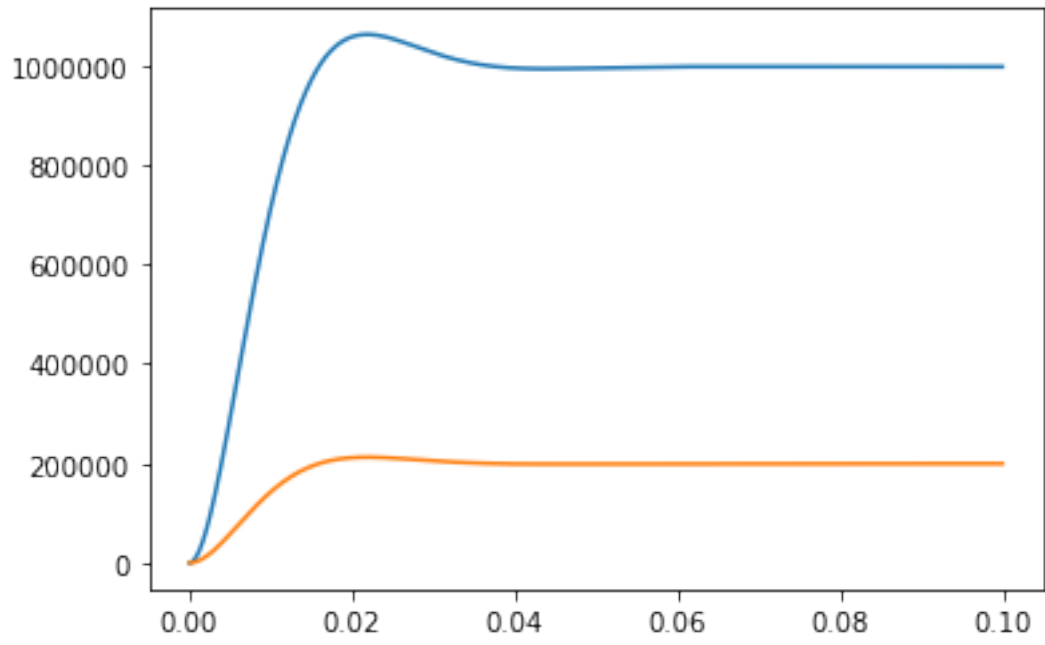
```
[4]: A
```

```
[4]: array([[ -250.        , -125.        ],
           [ 285.71428571,  -0.37714286]])
```

```
[5]: x = [np.array([[0], [0]])]
y = []
vS = 20
dt = 0.0001
t = np.arange(0, 0.1, dt)
for i in t:
    x.append(x[-1] + dt * A @ x[-1] + B * vS)
    y.append(C @ x[-1] + D * vS)
y = np.array(y)
```

```
[6]: plt.plot(t, y[:,0])
plt.plot(t, y[:,1])
```

```
[6]: [<matplotlib.lines.Line2D at 0x7ff82a554c10>]
```



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