Contents


```
% Joel Lubinitsky - 02/11/15
% MAE 321 - HW 4.2

clear all
close all
clc
```

Problem 3:

A pendulum decays from 12 cm to 2 cm over one period. Determine its damping ratio.

Unknown: ζ

Known

$x_1,\ x_2$

```
xPeak1 = 12; % cm
xPeak2 = 2;  % cm
```

Conversions

```
xPeak1 = xPeak1 / 100; % m
xPeak2 = xPeak2 / 100; % m
```

Calculations

$$\delta = \ln \frac{x_1}{x_2}$$

$$\zeta = \frac{\delta}{\sqrt{4\pi^2 + \delta^2}}$$

```
delta        = log(xPeak1 / xPeak2);
ratioDamping = delta / sqrt(4 * pi ^ 2 + delta ^ 2)
```

```
ratioDamping =

    0.2742
```

Results

The given pendulum has a damping ratio $\zeta = 0.274$.

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