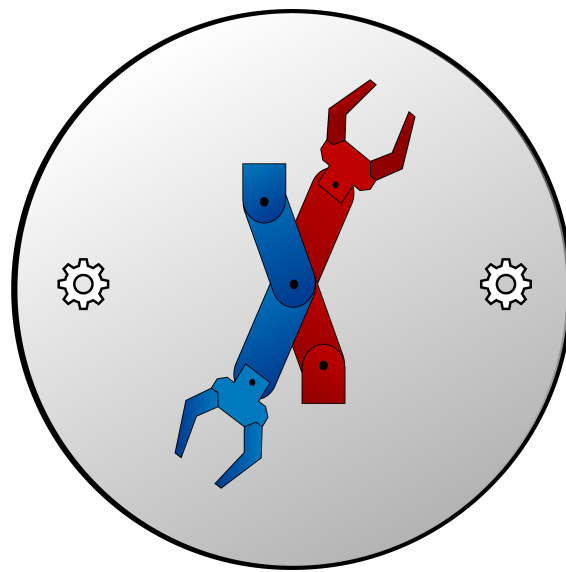


DOCUMENT TITLE 16pt. times new roman, small caps left adjusted

Trey Dufrene, Alan Wallingford, David Orcutt, Ryan Warner, Zack Johnson (Times New Roman, 12pt., single-spaced, left aligned)



ME 407 (Times New Roman, 12 pt., single-spaced, left aligned)

Preliminary Design of Robotic Systems

Embry-Riddle Aeronautical University



Meiosis

## Abstract

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latex table of contents, list of figures and table format with report document style

centered page numbers, roman numeral for frontmatter, arabic for rest

# List Of Acronyms and Abbreviations

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$G$	: Center of gravity of the bar
$\ell_0$	: Spring unstretched length
$\delta$	: Spring deflection
$k$	: Spring constant
$h_b$	: Distance to bar ( $G$ ) from datum
$F_s$	: Force onto bar due to spring
$A_n$	: Pin reaction in $\theta$ direction
$A_t$	: Pin reaction in tangential direction
$\vec{v}_G$	: Velocity of bar center of gravity
$\ddot{\theta}$	: Angular velocity of spring
$\ddot{\phi}$	: Angular velocity of bar
$\ddot{\ell}_s$	: Radial acceleration of spring

←

margins 1 inch all around →

# 1 A Level Heading

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## 2 A Level Heading

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### 2.1 B Level Heading

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## 2.2 Example for Bulleted List

bullets are 3 dashed lines

- First itemtext
- Second itemtext
- Last itemtext
- First itemtext
- Second itemtext

## 2.3 Example for Numbered List

1. First itemtext
2. Second itemtext
3. Last itemtext
4. First itemtext
5. Second itemtext

## 2.4 Example for Descriptive List

**First** itemtext

**Second** itemtext

**Last** itemtext

**First** itemtext

**Second** itemtext

## 3 A Level Heading

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Table 1: DH Table for 6 DOF Manipulator

**bold col headers, table times new roman, 12pt., centered,**

<b>DH</b>	$d_i$	$\theta_i$	$a_i$	$\alpha_i$
1	280	$q_1 - \pi$	0	$\pi/2$
2	0	$q_2 + \pi/2$	210	0
3	0	$q_3 - \pi/2$	75	$-\pi/2$
4	210	$q_4$	0	$\pi/2$
5	0	$q_5 - \pi$	0	$\pi/2$
6	70	$q_6$	0	0

*Table 1* (**italisized callouts**) shows the Denavit–Hartenberg parameters for the manipulator. Lorem ipsum dolor sit amet, consectetur adipiscing elit. Etiam lobortis facilisis sem. Nullam nec mi et neque pharetra sollicitudin. Praesent imperdiet mi nec ante. Donec ullamcorper, felis non sodales commodo, lectus velit ultrices augue, a dignissim nibh lectus placerat pede. Vivamus nunc nunc, molestie ut, ultricies vel, semper in, velit. Ut porttitor. Praesent in sapien. Lorem ipsum dolor sit amet, consectetur adipiscing elit. Duis fringilla tristique neque. Sed interdum libero ut metus. Pellentesque placerat. Nam rutrum augue a leo. Morbi sed elit sit amet ante lobortis sollicitudin. Praesent blandit blandit mauris. Praesent lectus tellus, aliquet aliquam, luctus a, egestas a, turpis. Mauris lacinia lorem sit amet ipsum. Nunc quis urna dictum turpis accumsan semper.

Taking the time derivative,

$$\vec{v}_G = \left[ \dot{\ell}_s \sin(\theta) + \frac{\ell_b \dot{\phi} \cos(\phi)}{2} + \ell_s \dot{\theta} \cos(\theta) \right] \hat{i} + \left[ \frac{\ell_b \dot{\phi} \sin(\phi)}{2} - \dot{\ell}_s \cos(\theta) + \ell_s \dot{\theta} \sin(\theta) \right] \hat{j}$$

Since the moment of inertia  $I$  for a uniform slender bar rotating about its end is  $\frac{1}{12}m\ell^2$  and  $\omega = \dot{\phi}$ ,

$$T_2 = \frac{1}{2}m_b(\vec{v}_G \cdot \vec{v}_G) + \frac{1}{24}m_b\ell_b^2\dot{\phi}^2$$

Total Kinetic Energy: equations 12pt, centered, numbered on right

$$T = T_1 + T_2 = \frac{1}{2}m_b(\vec{v}_G \cdot \vec{v}_G) + \frac{1}{24}m_b\ell_b^2\dot{\phi}^2 \quad (1)$$

$$\ddot{\theta} = \frac{d}{dt} \left( \frac{\partial \mathcal{L}}{\partial \dot{\theta}} \right) - \frac{\partial \mathcal{L}}{\partial \theta} = (Q_\theta)_{\text{non}} \quad (2)$$

$$\ddot{\phi} = \frac{d}{dt} \left( \frac{\partial \mathcal{L}}{\partial \dot{\phi}} \right) - \frac{\partial \mathcal{L}}{\partial \phi} = (Q_\phi)_{\text{non}} \quad (3)$$

## 4 A Level Heading

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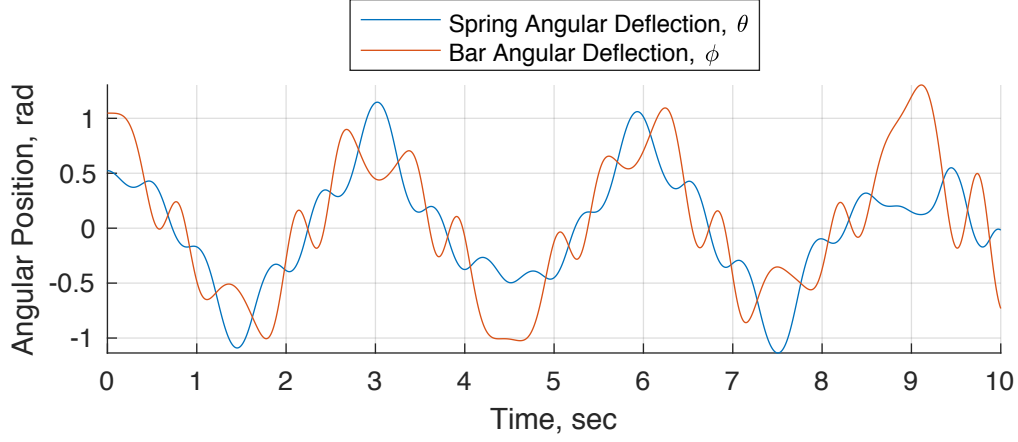


Figure 1: Numerical Solution Motion Behavior Plot, ( $\theta_o : 0, \phi_o : 0$ )

*Figure 1* shows the relationship between Lorem ipsum dolor sit amet, consectetur adipiscing elit. Etiam lobortis facilisis sem. Nullam nec mi et neque pharetra sollicitudin. Praesent imperdiet mi nec ante. Donec ullamcorper, felis non sodales commodo, lectus velit ultrices augue, a dignissim nibh lectus placerat pede. Vivamus nunc nunc, molestie ut, ultricies vel, semper in, velit. Ut porttitor. Praesent in sapien. Lorem ipsum dolor sit amet, consectetur adipiscing elit. Duis fringilla tristique neque. Sed interdum libero ut metus. Pellentesque placerat. Nam rutrum augue a leo. Morbi sed elit sit amet ante lobortis sollicitudin. Praesent blandit blandit mauris. Praesent lectus tellus, aliquet aliquam, luctus a, egestas a, turpis. Mauris lacinia lorem sit amet ipsum. Nunc quis urna dictum turpis accumsan semper.

## 5 A Level Heading

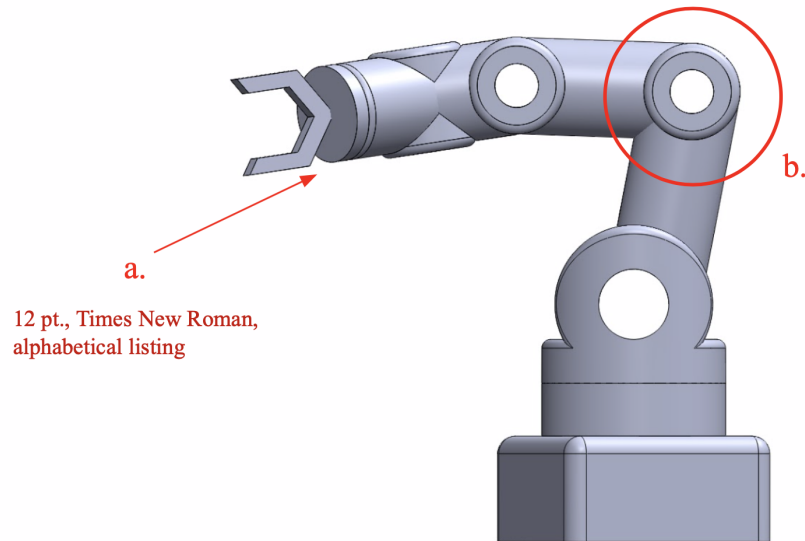


Figure 2: Figure with Callouts

a. Description for callout a

b. Description for callout b

As seen in *Figure 2*, callout a. is blah.

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# References

- [1] Justin Johnson, Alexandre Alahi, and Fei-Fei Li. Perceptual losses for real-time style transfer and super-resolution. *CoRR*, abs/1603.08155, 2016.
- [2] Olaf Ronneberger, Philipp Fischer, and Thomas Brox. U-net: Convolutional networks for biomedical image segmentation. *CoRR*, abs/1505.04597, 2015.
- [3] Leslie N. Smith. A disciplined approach to neural network hyper-parameters: Part 1 - learning rate, batch size, momentum, and weight decay. *CoRR*, abs/1803.09820, 2018.

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all references follow IEEE formatting

## Acknowledgements & Attributions

- First itemtext
- Second itemtext
- Last itemtext
- First itemtext
- Second itemtext

# Appendix

Listing 1: Example Code Listing

---

```
1 Lagrangian = T - V;
2 % Partial of Lagrange Eq. w.r.t. thetadot
3 dLdthetadot = diff(Lagrangian, thetadot);
4 dLdthetadot_subbed = subs(dLdthetadot, [thetat, thetadot, phit, phidot, ...
5     l1t, l1dot], [theta, diff(theta,t), phi, diff(phi,t), l1, diff(l1,t)]);
6 % Time derivative of Partial of Lagrange Eq. w.r.t. thetadot
7 ddLdthetadotdt = diff(dLdthetadot_subbed, t);
8 % Partial of Lagrange Eq. w.r.t. theta
9 dLdtheta = diff(Lagrangian, thetat);
10 % Theta EOM
11 eqn(1) = ddLdthetadotdt - dLdtheta == 0;
```

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transparency

Meiosis

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right hand corner

1

# Title Slide

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Subtitle

Arial, 28 pt., centered, dark gray 3 (#595959)

Meiosis

# Section Header Slide

Arial, 36 pt., centered

Meiosis



# Title and Body Slide Arial, 28 pt., left aligned

Body Text Arial, 18 pt., dark gray 3 (#595959)

- First level Arial, 18 pt., [dark gray 3 (#595959)] (all levels)
  - Second level [Arial, 14 pt.] (Second — Ninth levels)
    - Third level
      - Fourth level
        - Fifth level
          - Sixth level
            - Seventh level
              - Eighth level
                - Ninth level

Meiosis

# Title and Two Columns

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Normal body text Arial, 14 pt., dark gray 3 (#595959)

Normal body text Arial, 14 pt., dark gray 3 (#595959)

Meiosis

# Title Only Slide

Arial, 28 pt., left aligned

Meiosis

# One Column Text

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Normal Body Text Arial, 12 pt., left aligned

- First level Arial, 12 pt. (all levels)
  - Second Level
    - Third level
      - Fourth level

# Meiosis

# Main Point Slide

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Meiosis

# Section Title

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## Subtitle

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# Meiosis

Description Arial, 18 pt., left aligned, right side

# Meiosis

## Caption Slide

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Subtitle

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# Question Slide

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# Figure Formatting

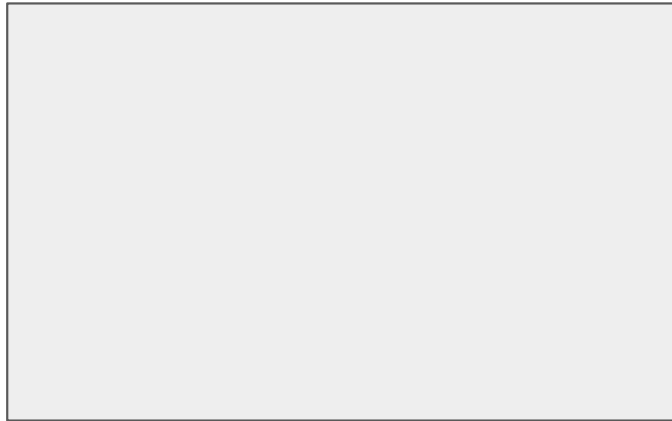


Figure Title [1]  
(Arial 12 pt. Font,  
centered below figure)

# References Slide

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# Acknowledgement Slide

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Meiosis

# Table Formatting

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123 <i>Arial, 10 pt.</i>	123
456	456
789	789
Total	1368

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