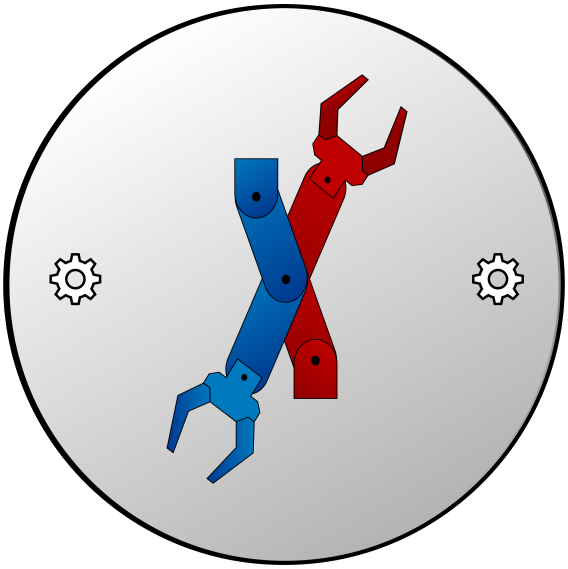
Document Title 16pt. times new roman, small caps left adjusted

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

EMBRY-RIDDLE AERONAUTICAL UNIVERSITY

Meiosis

Abstract

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Contents

List of Figures

List of Tables

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

(↑ bold) 12pt times new roman centered horiz & vert, full line space between header and text

G :	Center of gravity of the bar
ℓ_0 :	Spring unstretched length
δ :	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 θ 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

↑ left adjusted all headings arabic numbering ,full line space between headers and text
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2 A Level Heading

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2.1 B Level Heading

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2.1.0.a D level heading

By definition, "A manipulator having more than six DOF is referred to as a kinematically redundant manipulator [1, pp. 5]."

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

2.3.0.a First itemtext

2.3.0.b Second itemtext

2.3.0.c Last itemtext

2.3.0.d First itemtext

2.3.0.e Second itemtext

2.4 Example for Descriptive List

First itemtext

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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,

DH	d_i	θ_i	a_i	α_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, consectetuer 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, consectetuer 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,

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

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

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

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

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

4 A Level Heading

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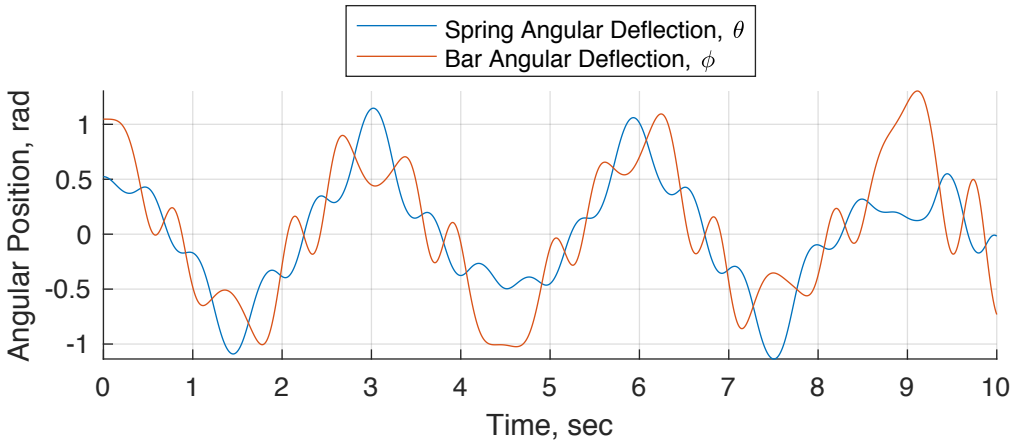

Figure 1: Numerical Solution Motion Behavior Plot, ($\theta_o :\ 0,\ \phi_o :\ 0$)

Figure 1 shows the relationship between Lorem ipsum dolor sit amet, consectetuer 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, consectetuer 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

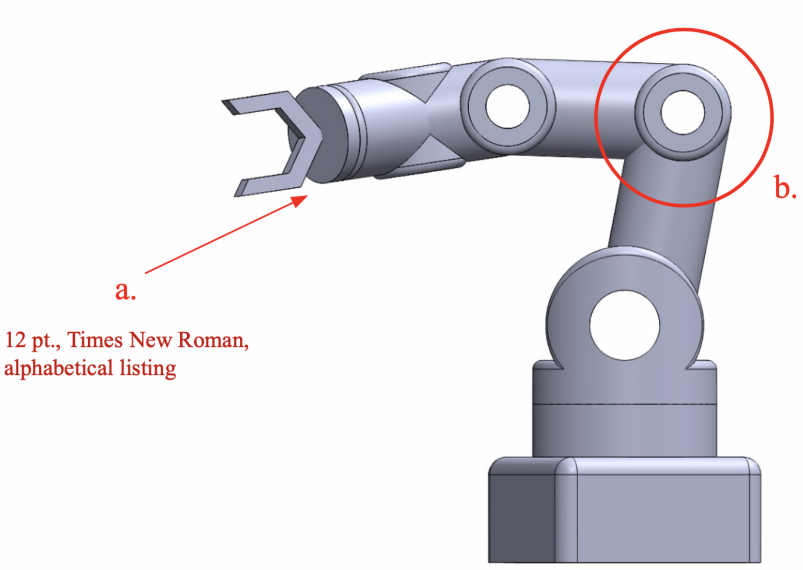

Figure 2: Figure with Callouts

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.

12pt times new roman left justified
all references follow IEEE formatting

Acknowledgements & Attributions

— First itemtext

— Second itemtext

— Last itemtext

— First itemtext

— Second itemtext

Appendix

Listing 1: Example Code Listing

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

(Blank Slide)

Logo 0.07 in. from left, 4.83 in from top, 50% transparency

Slide number, arabic, lower right hand corner

Title Slide

Arial, 52 pt., centered

Subtitle

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

Meiosis

Section Header Slide Arial, 36 pt., centered

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

Title and Two Columns Arial, 28 pt., left aligned

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

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

Title Only Slide Arial, 28 pt., left aligned

One Column Text

Arial, 24 pt., centered over column

Normal Body Text Arial, 12 pt., left aligned

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

Main Point Slide Arial, 48 pt., left aligned

Section Title

Arial, 42 pt., centered, left side

Subtitle

Arial, 21 pt., centered, dark gray 3 (#595959)

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

Meiosis

Caption Slide

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Subtitle

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

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Question Slide

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Figure Formatting

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

References Slide Arial, 28 pt., left aligned (Title and Two column slide)

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

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

Acknowledgement Slide Arial, 28 pt., left aligned (title and body slide)

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

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    - Third level
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Meiosis

Table Formatting

Column Header Arial, 10 pt., bold	**Col. Header 2**
123 Arial, 10 pt.	123
456	456
789	789
Total	1368