

MATLAB Assignment #1

Reading Assignment:

MATLAB Lecture #1

Chapter 1 in MATLAB – An Introduction with Applications, 5th Edition, by Gilat

MATLAB Assignment:

- (60 points) Work the following problems in Chapter 1 of MATLAB – An Introduction with Applications, 5th Edition, by Gilat: 1a, 3a, 5a, 7a, 9a, 11, 12a, 12b, 19b, 30, 37
- (40 points) Use MATLAB to solve the problems below. In each case, use variables for all given values and pick good choices for variable names (for example, use Radius rather than x for the radius of a circle). Use comments to label each part of the problem (3A, 3B, 3C, etc) and print the results from the Command Window as in problem 1. Consult a math book for the formulas needed if you do not know them.
Refer to the diagram of motor with a small pulley turning a larger pulley on a cable.
 - If a 5 cm diameter wheel on a cable turns at 1000 rpm, what is its speed in m/s?
 - If a 7.5 cm diameter wheel moves along the cable at 5 m/s, what is its speed in rpm?
 - If a 6.4 mm pulley on a motor is used to drive a 5 cm pulley on a cable, at what speed does the cable pulley turn (in rpm) if the motor turns at 2000 rpm?
 - If a 6.4 mm pulley on a motor turns at 2000 rpm and is used to drive a pulley on a cable, what diameter cable pulley is required is the cable pulley is to turn at 650 rpm?
 - If a cable car moves along a track at 2.4 m/s, how long does it take to travel 50 meters?
 - If a cable car travels 15 meters along a cable in 4.2 s, what is its speed in m/s?
 - If a 6.4 mm pulley on a motor is used to drive a 3.8 cm pulley on a cable and the motor turns at 4000 rpm, how long does it take for the cable car to travel 50 meters?

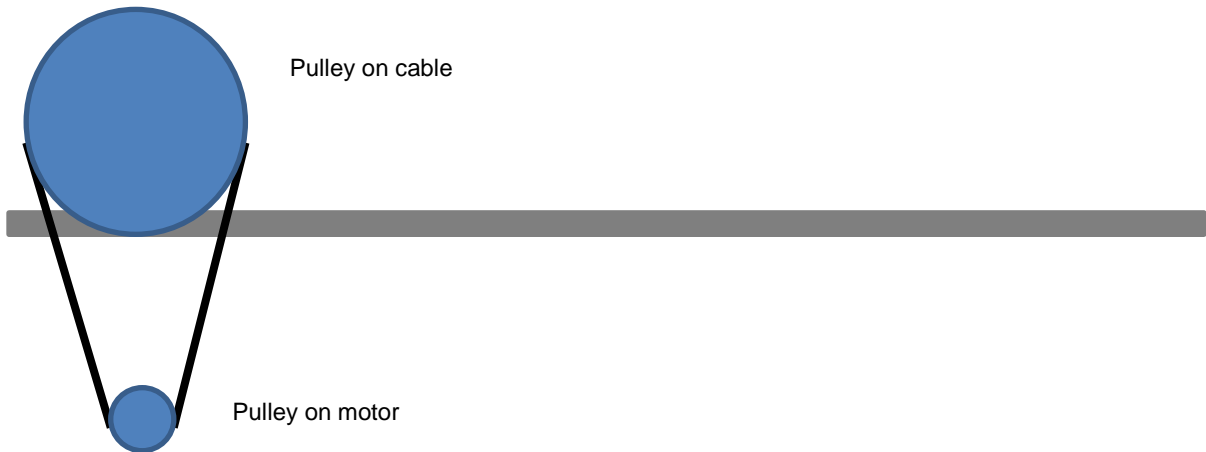
NOTE:

- Begin by entering the command **clc** to clear the Command Window.
- Enter your name, the course number and title, and the assignment number as comments.
- Include the problem number (problem1a, problem2a, etc) in the variable name for display.
- Suppress printing (;) with all intermediate results, and display the final output in the Command Window.
- Use **File – Print** to print all contents in the Command Window.
- Copy and save your work in Notepad as a textfile. If/when you make errors, revise the text file, such that it contains all of the correct solutions. Delete all of the incorrect attempts. Then copy and paste this notepad file into the Matlab command window to generate a final display of your solutions. Do not print any errors or any extra information not required by the assignment. You might want to print and save after every few parts. (We will learn a better way to revise, save and print results in the next assignment.)

Command Window

```
>> % John Doe
>> % EGR 110 - Engineering Graphics
>> % MATLAB Assignment #1
>> format compact % suppress extra lines in output
>> % Part 1A)
>> x=5;
>> y=x^3
y =
    125
>> % Part 1B)
```

Illustration and Examples for Part 2



Example: Convert a 10 cm diameter wheel's velocity, V , from 50 rpm (revolutions/minute) to m/s.

$$V = \left[\frac{250 \text{ rev}}{\text{min}} \right] \left[\frac{10\pi \text{ cm}}{\text{rev}} \right] \left[\frac{1 \text{ min}}{60 \text{ s}} \right] \left[\frac{1 \text{ meter}}{100 \text{ cm}} \right] = 1.31 \text{ m/s}$$

Example: If a wheel on a cable is moving at 1.5 m/s, how long does it take to travel 22.5 m on the cable?

$$\text{Time} = \frac{\text{Distance}}{\text{Velocity}} = \frac{22.5 \text{ m}}{1.5 \text{ m/s}} = 15 \text{ s}$$

Example: If the motor pulley has a 2.5 cm diameter and turns at 2000 rpm, how fast does the wheel on the cable turn if it has a diameter of 10 cm?

$$\text{Cable pulley speed} = \left[\text{motor pulley speed} \right] \left[\frac{d_{\text{motor}}}{d_{\text{pulley}}} \right]$$

$$\text{Cable pulley speed} = \left[2000 \text{ rpm} \right] \left[\frac{2.5 \text{ cm}}{10 \text{ cm}} \right] = 500 \text{ rpm}$$