EME 152 Discussion 5

October 27, 2021

Agenda

- Ch computational arrays (review)
- Basic plotting
  - plotxy()
  - unwrap()
- Solidworks Demo

Ch computational arrays (review)

How to declare a computational array/matrix:

```
array double mat[r][c] = { a11, a12, ... aNN };
```

How to assign or retrieve a value within the matrix:

```
mat[0][0] = a11;
```

```
printf("a11 = %lf\n", mat[0][0]);
```

Ch computational arrays (review)

Solve the following linear equation using computational arrays:

$$Ax = b$$

$$\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} = \begin{bmatrix} 2 \\ 5 \end{bmatrix}$$

Ch computational arrays (review)

Solution:

```
linsolve(x, A, b);
```

Output:

```
x=1.0 0.5
```

Basic Plotting

Plot the volume of a cylinder as a function of its radius, in meters. Set the height to 10m with the radius varying from 0m to 10m.

Basic Plotting

Solution:

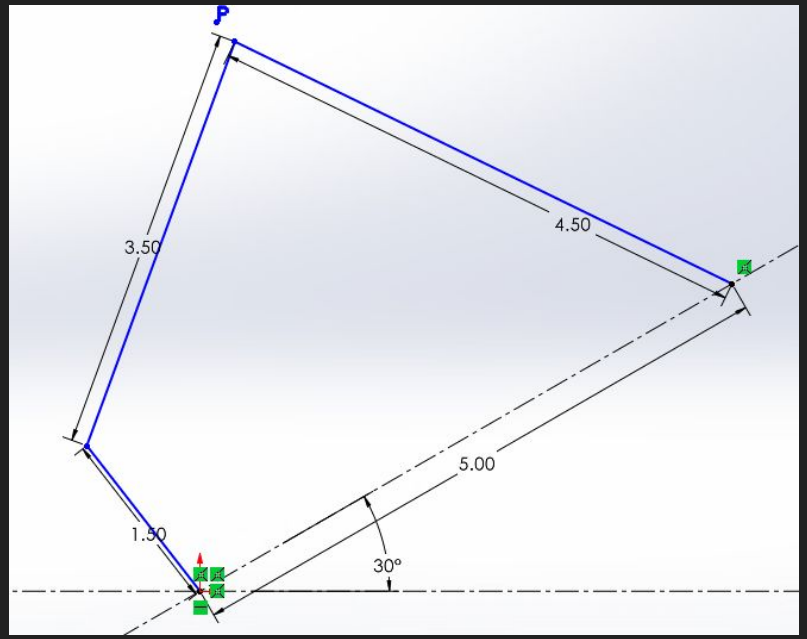
```
#include <chplot.h>

...

plotxy(x, y, N, "Plot Title", "X-axis Label", "Y-axis
Label");
```

Advanced Plotting

Plot the output position P of this mechanism as a function of the input link angle (theta2.) Plot the “wrapped” (-pi, pi) and “unwrapped” (0, 2pi) positions in a subplot.



Advanced Plotting

Solution:

Unwrapping:

```
unwrap(unwrappedArray, originalArray);
```

Plotting:

```
subplot.subplot(r, c);
plot = subplot.getSubplot(0, 0);
plot->data2D(x, y);
```

Solidworks Demo

Thank you!

Questions?