

Basic MATLAB

Inputting a matrix

- (1) Use a bracket square bracket for a matrix.
- (2) Input the matrix one row at a time. Each new column is separated by a comma and each new row is separated by a semi-colon

Example:

$$A=[11,12,13;21,22,23;31,32,33] \text{ returns } \begin{bmatrix} 11 & 12 & 13 \\ 21 & 22 & 23 \\ 31 & 32 & 33 \end{bmatrix}$$

Multiplication

By default multiplication is matrix multiplication

$$[1,2;1,2]*[1,2;1,2] \text{ returns } \begin{bmatrix} 1 & 2 \\ 1 & 2 \end{bmatrix} * \begin{bmatrix} 1 & 2 \\ 1 & 2 \end{bmatrix} = \begin{bmatrix} 3 & 6 \\ 3 & 6 \end{bmatrix}$$

If you want to do point by point multiplication use a period before the operation

$$[1,2;1,2].*[1,2;1,2] \text{ returns } \begin{bmatrix} 1 & 2 \\ 1 & 2 \end{bmatrix} .* \begin{bmatrix} 1 & 2 \\ 1 & 2 \end{bmatrix} = \begin{bmatrix} 1 & 4 \\ 1 & 4 \end{bmatrix}$$

for loops

increment through each variable

for k=1:5

 val(k)=k^2

end

returns

```
val=[1, 4, 9, 16, 25]
```

while loops

repeat the loop until a condition is met.

```
k=1
```

```
while k<6
```

```
    k=k+1
```

```
    val=k
```

```
end
```

returns: val=6

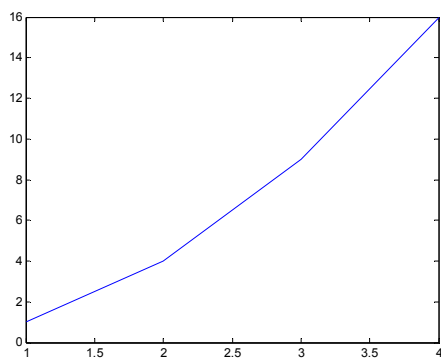
Plotting

Plot to vectors

```
A=[1,2,3,4]
```

```
B=A.^2 (point by point square)
```

```
plot(A,B)
```



returns:

Example: Plot power absorbed in the resistor as a function of the resistance for the circuit shown in

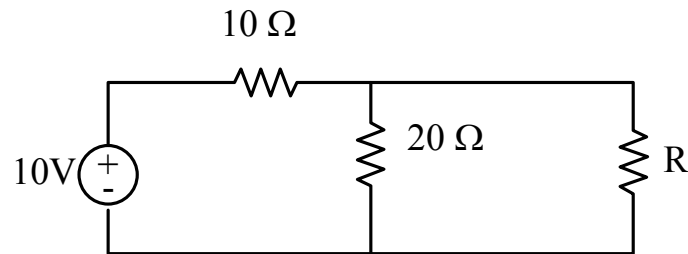


Figure 1

$$\frac{V_A - 10}{10} + \frac{V_A}{20} + \frac{V_A}{R} = 0$$

$$V_A = 1 * \left(\frac{1}{10} + \frac{1}{20} + \frac{1}{R} \right)^{-1}$$

MATLAB code:

```
R=0    %set the starting resistance

Power=[];    %start with an empty vector for power

RR=[];    %start with an empty resistance vector

while R<100

    R=R+.5    %increment the resistance

    VA=1*(1/10+1/20+1/R)^(-1)    %compute the voltage

    Power=[Power,VA^2/R]    %compute the power and save in a vector

    RR=[RR,R]    %save the resistance in a vector

end

plot(RR,Power)    %plot the power versus resistance
```

