

### **MATLAB Solution of Simultaneous Equations**

This concerns the solution of the matrix problem:

$$[A][x]=[B]$$

where [A] is the coefficient matrix that is  $n \times n$  (a total of  $n^2$  elements), [x] is the desired solution matrix and is  $n \times 1$ , and [B] is the right-hand side matrix and is  $n \times 1$ .

As an example let's show how to enter the matrix called [A] into MATLAB

$$[A]=\begin{bmatrix} 1 & 0 & 3 \\ 2 & 1 & 3 \\ -1 & -2 & 4 \end{bmatrix}$$

The matrix would be entered in MATLAB as

$$A=[1,0,3; 2,1,3; -1,-2,4]$$

Here's what you need to notice, elements within the same row are separated by commas (,) and elements on different rows are separated by semicolons (;).

Now entering the matrix [B] into MATLAB as

$$B=[-2;-1;5]$$

To get the solution vector [x] one simply needs to type

$$x=A \setminus B$$

Yes that's a backslash (\) which sort of means take [B] and "divide" it by [A], but what really happens is an inversion of [A] which is then multiplied by [B] giving [x] as

$$[x]=\begin{bmatrix} -29.0000 \\ 30.0000 \\ 9.0000 \end{bmatrix}$$

Note that MATLAB may be modified to display different numbers of digits, but in this case the result really should be shown as

$$[x]=\begin{bmatrix} -29 \\ 30 \\ 9 \end{bmatrix}$$