## Matrices in EXCEL

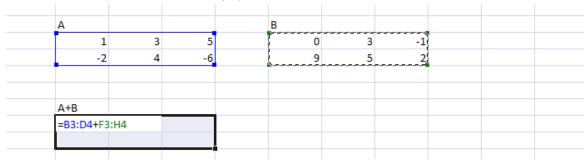
First enter the desired matrices.

	A	U	C	U	L	1	U	- 11	 J	IX
1										
2		Α				В				
3		1	3	5		0	3	-1		
4		-2	4	-6		9	5	2		
5										

To compute A + B, first select a range of cells with the same dimensions.

	B8	-	(	$f_{\mathcal{K}}$						
	Α	В	С	D	Е	F	G	Н	1	J
1										
2		Α				В				
3		1	3	5		0	3	-1		
4		-2	4	-6		9	5	2		
5										
6										
7		A+B								
8										
9										
10										

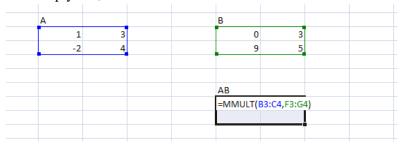
hit = and then select all the cells in A, +, select all the cells in B.



Press Ctrl-Shift-Enter at the same time and the resulting sum matrix A+B, should appear.

Α			В			
1	. 3	5	0	3	-1	
-2	4	-6	9	5	2	
A+B						
1	. 6	4				
7	9	-4				
		·				

To multiply AB, use the MMULT command.



Press **Ctrl-Shift-Enter** at the same time to see the result. (**Command + Enter** on a MAC)

Solving a system in EXCEL

$$2x + y - z = 0$$
  
 $x - 2y + 3z = 11$   
 $-x + 2y + 2z = -6$ 

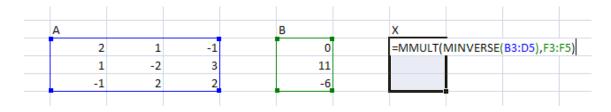
The coefficient matrix is 
$$A = \begin{bmatrix} 2 & 1 & -1 \\ 1 & -2 & 3 \\ -1 & 2 & 2 \end{bmatrix}$$
, the unknown matrix is  $X = \begin{bmatrix} x \\ y \\ z \end{bmatrix}$  and the objective matrix is  $B = \begin{bmatrix} 0 \\ 11 \\ -6 \end{bmatrix}$ 

The system can be written as the following matrix equation AX = B. Since matrix multiplication is not commutative you multiply both sides of the equation by  $A^{-1}$  on the left.

$$A^{-1}AX = A^{-1}B$$
.  $A^{-1}A = I$  (identity matrix) and  $IX = X$  so  $X = A^{-1}B$ .

4	В	С	D	Е	F	G
	Α				В	
	2	1	-1		0	
	1	-2	3		11	
	-1	2	2		-6	

The EXCEL command MINVERSE will find the inverse of a matrix. Use MMULT and MININVERSE to solve the system.



Α			В	X	
2	1	-1	0	2	
1	-2	3	11	-3	
-1	2	2	-6	1	