

Práctica 1 de MAPLE, curso 2009/10

Profesora: Eugenia Rosado

```
> restart: with(linalg):  
Warning, the protected names norm and trace have been redefined and  
unprotected
```

Ejercicio 1

Sea f la aplicación lineal que satisface:

```
> f(1,2,3,4):=[6, 7, 26, 6, -1];  
f(0,2,-1,2):=[4, 1, 8, -6, -3];  
f(1,0,4,-5):=[-5, 6, -3, 12, 9];  
f(0,1,2,1):=[2, 3, 9, 2, 1];  
  
f(1, 2, 3, 4) := [6, 7, 26, 6, -1]  
f(0, 2, -1, 2) := [4, 1, 8, -6, -3]  
f(1, 0, 4, -5) := [-5, 6, -3, 12, 9]  
f(0, 1, 2, 1) := [2, 3, 9, 2, 1]  
  
> MB1Bc:=concat([1,2,3,4],[0,2,-1,2],[1,0,4,-5],[0,1,2,1]);  
  
MB1Bc := 
$$\begin{bmatrix} 1 & 0 & 1 & 0 \\ 2 & 2 & 0 & 1 \\ 3 & -1 & 4 & 2 \\ 4 & 2 & -5 & 1 \end{bmatrix}$$
  
  
> det(MB1Bc);  
  
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> Mf_B1Bc:=concat(f(1,2,3,4),f(0,2,-1,2),f(1,0,4,-5),f(0,1,2,1));  
  
Mf_B1Bc := 
$$\begin{bmatrix} 6 & 4 & -5 & 2 \\ 7 & 1 & 6 & 3 \\ 26 & 8 & -3 & 9 \\ 6 & -6 & 12 & 2 \\ -1 & -3 & 9 & 1 \end{bmatrix}$$
  
  
> Mf:=evalm(Mf_B1Bc*inverse(MB1Bc));  
  
Mf := 
$$\begin{bmatrix} 0 & 1 & 0 & 1 \\ 2 & 1 & 1 & 0 \\ 4 & 2 & 2 & 3 \\ 4 & -2 & 2 & 0 \\ 0 & 0 & 1 & -1 \end{bmatrix}$$
  
  
> evalm(Mf*[1,2,3,4]);  
evalm(Mf*[0,2,-1,2]);  
evalm(Mf*[1,0,4,-5]);  
evalm(Mf*[0,1,2,1]);  
  
[6, 7, 26, 6, -1]  
[4, 1, 8, -6, -3]  
[-5, 6, -3, 12, 9]  
[2, 3, 9, 2, 1]
```

[Hallar el subespacio Imagen de f

[> **rank(Mf);**

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[> **0=det(concat(Mf,[x1,x2,x3,x4,x5]));**

$$0 = -6x^4 + 8x^3 - 24x^1 - 4x^2$$

[Se considera la siguiente base del espacio de llegada:

[> **u1:=[1,2,3,4,5];**

u2:=[1,0,1,3,6];

u3:=[0,3,6,-5,7];

u4:=[1,1,2,2,1];

u5:=[9,-4,3,0,1];

$$u1 := [1, 2, 3, 4, 5]$$

$$u2 := [1, 0, 1, 3, 6]$$

$$u3 := [0, 3, 6, -5, 7]$$

$$u4 := [1, 1, 2, 2, 1]$$

$$u5 := [9, -4, 3, 0, 1]$$

[> **MBcB2:=concat(u1,u2,u3,u4,u5);**

$$MBcB2 := \begin{bmatrix} 1 & 1 & 0 & 1 & 9 \\ 2 & 0 & 3 & 1 & -4 \\ 3 & 1 & 6 & 2 & 3 \\ 4 & 3 & -5 & 2 & 0 \\ 5 & 6 & 7 & 1 & 1 \end{bmatrix}$$

[> **det(MBcB2);**

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[> **Mf_BcB2:=evalm(MBcB2*Mf);**

$$Mf_BcB2 := \begin{bmatrix} 6 & 0 & 12 & -8 \\ 16 & 6 & 4 & 15 \\ 34 & 12 & 20 & 18 \\ -6 & -7 & -3 & -11 \\ 44 & 23 & 23 & 25 \end{bmatrix}$$

[> **Mf_B1B2:=evalm(MBcB2*Mf_B1Bc);**

$$Mf_B1B2 := \begin{bmatrix} 10 & -28 & 94 & 16 \\ 100 & 38 & -43 & 29 \\ 190 & 40 & 24 & 70 \\ -73 & -33 & 37 & -24 \\ 259 & 73 & 11 & 94 \end{bmatrix}$$

[>

[>