AMD - TAREA DE ESPACIO AFÍN

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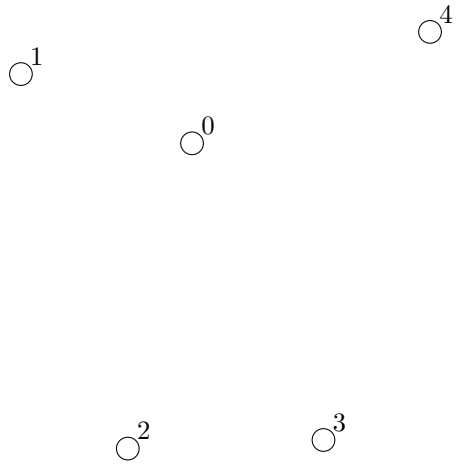
Ejercicio 1. *Dado el polígono de vértices C_0, C_1, C_2, C_3, C_4 en el plano, determina la posición de los $P_0, P_1, \cdots, P_9$ con respecto a dicho polígono, es decir, para cada uno de ellos determinar si están dentro, fuera o en el borde del polígono (Sugerencia: Descomponer el polígono en varios triángulos y resolver cada problema por separado).*

Datos

```
C =  column_matrix(RR,[[-0.172651912033068,0.425473646411074],
[-0.927177836444634,0.730828051174769],
[-0.455968358491447,-0.920601173524937],
[0.406985519949459,-0.882736889806611],
[0.876887465140915,0.916803361839041]])
P =  column_matrix(RR,[
[0.629081226542386,0.741279405121107],
[-0.448184676007223,-0.303402020267078],
[-0.541604965947982,0.633876454181660],
[-0.364100606388708,0.257256981672285],
[0.429547739604162,0.444885711632425],
[0.407307318948960,0.762730650438023],
[-0.992167831095530,-0.468225919921707],
[0.813501066850795,0.380278966484519],
[0.194118465888270,-0.947683683347809],
[0.691495569525582,-0.786581561257583]])
C0 = vector(C[:,0])
C1 = vector(C[:,1])
C2 = vector(C[:,2])
C3 = vector(C[:,3])
C4 = vector(C[:,4])
```

$$C_0 = \begin{bmatrix} -0.172651912033068 \\ 0.425473646411074 \end{bmatrix}, C_1 = \begin{bmatrix} -0.927177836444634 \\ 0.730828051174769 \end{bmatrix}, C_2 = \begin{bmatrix} -0.455968358491447 \\ -0.920601173524937 \end{bmatrix},$$
$$C_3 = \begin{bmatrix} 0.406985519949459 \\ -0.882736889806611 \end{bmatrix}, C_4 = \begin{bmatrix} 0.876887465140915 \\ 0.916803361839041 \end{bmatrix},$$
$$P_0 = \begin{bmatrix} 0.629081226542386 \\ 0.741279405121107 \end{bmatrix}, P_1 = \begin{bmatrix} -0.448184676007223 \\ -0.303402020267078 \end{bmatrix}, P_2 = \begin{bmatrix} -0.541604965947982 \\ 0.633876454181660 \end{bmatrix},$$
$$P_3 = \begin{bmatrix} -0.364100606388708 \\ 0.257256981672285 \end{bmatrix}, P_4 = \begin{bmatrix} 0.429547739604162 \\ 0.444885711632425 \end{bmatrix}, P_5 = \begin{bmatrix} 0.407307318948960 \\ 0.762730650438023 \end{bmatrix},$$
$$P_6 = \begin{bmatrix} -0.992167831095530 \\ -0.468225919921707 \end{bmatrix}, P_7 = \begin{bmatrix} 0.813501066850795 \\ 0.380278966484519 \end{bmatrix},$$
$$P_8 = \begin{bmatrix} 0.194118465888270 \\ -0.947683683347809 \end{bmatrix}, P_9 = \begin{bmatrix} 0.691495569525582 \\ -0.786581561257583 \end{bmatrix}$$

Solución:



Triangulos 012, 023 y 034

```
R0 = matrix(RR,  [
[1,     1,          1],
[C0[0], C1[0],     C2[0]],
[C0[1], C1[1],     C2[1]]]);
R1 = matrix(RR,  [
[1,     1,          1],
[C0[0], C2[0],     C3[0]],
[C0[1], C2[1],     C3[1]]]);
R2 = matrix(RR,  [
[1,     1,          1],
[C0[0], C3[0],     C4[0]],
[C0[1], C3[1],     C4[1]]]);
```

$$R_0 = \begin{bmatrix} 1.00000000000000 & 1.00000000000000 & 1.00000000000000 \\ -0.172651912033068 & -0.927177836444634 & -0.455968358491447 \\ 0.425473646411074 & 0.730828051174769 & -0.920601173524937 \end{bmatrix}$$

$$R_1 = \begin{bmatrix} 1.00000000000000 & 1.00000000000000 & 1.00000000000000 \\ -0.172651912033068 & -0.455968358491447 & 0.406985519949459 \\ 0.425473646411074 & -0.920601173524937 & -0.882736889806611 \end{bmatrix}$$

$$R_2 = \begin{bmatrix} 1.00000000000000 & 1.00000000000000 & 1.00000000000000 \\ -0.172651912033068 & 0.406985519949459 & 0.876887465140915 \\ 0.425473646411074 & -0.882736889806611 & 0.916803361839041 \end{bmatrix}$$

$[(0.629081226542386,\ 0.741279405121107)\,,(-0.448184676007223,\ -0.303402020267078)\,,(-0.541604965947982,\ 0.633876454181$