

TALLER ECUACIONES LINEALES

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1. PROGRAMA EN OCTAVE PARA SOLUCIONAR UN SISTEMA DE ECUACIONES LINEALES

```
%Programa para resolver un sistema de ecuaciones lineales
%Usando la regla de Cramer
function x=cramer(A,b)
n=length(b);
x=zeros(n,1);
for k=1:n
    Ak=A;
    Ak(:,k)=b;
    x(k)=det(Ak)/det(A);
end
```

```
A=[3 -1 -1;-1 3 -1;-1 -1 3]
b=[3;3;7]
cramer(A,b)
```

The screenshot shows the Octave environment. On the left is the 'Explorador de archivos' (File Explorer) showing the file 'cramer.m'. Below it is the 'Historial de comandos' (Command History) window. On the right is the 'Editor' window showing the code for 'cramer.m'. At the bottom right is the 'Ventana de comandos' (Command Window) showing the execution of the function.

Directorio actual: C:\Users\danie\Downloads\Trabajo Grupo\Cramer

Explorador de archivos: Nombre: cramer.m

Historial de comandos:

```

pf(g,1.5,12,0.002)
clc
g = @(x) ((-x^3 - 1
pf(g,1.5,12,0.002)
g = @(x) ((-x^3 - 1
pf(g,1.5,12,0.002)
g = @(x) ((-x^3 - 1
pf(g,1.5,100,0.002)
pf(g,1.5,12,0.002)
pf(g,1.5,15,0.002)
pf(g,1.5,20,0.002)
pf(g,1.5,21,0.002)
pf(g,1.5,30,0.002)
pf(g,1.5,35,0.002)
pf(g,1.5,40,0.002)
clc
cramer
A={{[
CLC
clc
# Octave 9.2.0, Sat
cramer
A=[3 -1 -1;-1 3 -1;
b=[3;3;7]
cramer(A,b)

```

Editor:

```

1 %Programa para resolvdre un sistemas de ecuaciones
2 %Usando la regla de Cramer
3 function x=cramer(A,b)
4 n=length(b);
5 x=zeros(n,1);
6 for k=1:n
7 Ak=A;
8 Ak(:,k)=b;
9 x(k)=det(Ak)/det(A);
10 end

```

Ventana de comandos:

```

>> A=[3 -1 -1;-1 3 -1;-1 -1 3]
A =
     3     -1     -1
    -1      3     -1
    -1     -1      3

>> b=[3;3;7]
b =
     3
     3
     7

>> cramer(A,b)
ans =
     4
     4
     5

>>

```

2. Utilizando la Regla de Cramer en Octave, soluciona el siguiente sistema de ecuaciones lineales:

$$234X_1 + 543Y_1 - 896Z_1 - 532X_2 + 587Y_2 - 943Z_2 + 908X_3 - 873Y_3 + 874Z_3 = 165795$$

$$567X_1 - 674Y_1 + 234Z_1 + 154X_2 + 874Y_2 + 735Z_2 + 456X_3 + 312Y_3 - 873Z_3 = 354234$$

$$678X_1 + 571Y_1 - 675Z_1 - 121X_2 + 834Y_2 - 731Z_2 + 583X_3 - 931Y_3 + 743Z_3 = 867453$$

$$342X_1 - 421Y_1 - 896Z_1 + 687X_2 + 347Y_2 - 121Z_2 + 890X_3 + 873Y_3 - 111Z_3 = 521765$$

$$907X_1 - 456Y_1 + 654Z_1 + 533X_2 - 111Y_2 + 222Z_2 - 888X_3 + 452Y_3 - 984Z_3 = 298678$$

$$333X_1 + 523Y_1 + 768Z_1 + 544X_2 - 777Y_2 + 234Z_2 - 911X_3 + 900Y_3 - 222Z_3 = 983721$$

$$451X_1 + 666Y_1 - 905Z_1 - 142X_2 + 905Y_2 - 661Z_2 + 809X_3 - 212Y_3 + 453Z_3 = 765213$$

$$231X_1 - 541Y_1 + 833Z_1 + 544X_2 - 588Y_2 + 991Z_2 - 978X_3 + 866Y_3 - 567Z_3 = 456321$$

$$980X_1 + 143Y_1 - 254Z_1 - 879X_2 + 177Y_2 - 155Z_2 + 769X_3 - 231Y_3 + 457Z_3 = 874623$$

```

1 %Programa para resolver un sistemas de ecuaciones lineales
2 %Usando la regla de Cramer
3 function x=cramer(A,b)
4     n=length(b);
5     x=zeros(n,1);
6     for k=1:n
7         Ak=A;
8         Ak(:,k)=b;
9         x(k)=det(Ak)/det(A);
10    end

```

Ventana de comandos

```

>> A = [234, 543, -896, -532, 587, -943, 908, -873, 874; 567, -674, 234, 154, 874, 735, 456, 312, -873; 678, 571, -675, -121, 834, -731, 583, -931, 743; 342, -421, -896, 687, 347, -121, 890, 873, -111; 907, -456, 654, 533, -111, 222, -888, 452, -984; 333, 523, 768, 544, -777, 234, -911, 900, -222; 451, 666, -905, -142, 905, -661, 809, -212, 453; 231, -541, 833, 544, -588, 991, -978, 866, -567; 980, 143, -254, -879, 177, -155, 769, -231, 457]
A =
    234    543   -896   -532    587   -943    908   -873    874
    567   -674    234    154    874    735    456    312   -873
    678    571   -675   -121    834   -731    583   -931    743
    342   -421   -896    687    347   -121    890    873   -111
    907   -456    654    533   -111    222   -888    452   -984
    333    523    768    544   -777    234   -911    900   -222
    451    666   -905   -142    905   -661    809   -212    453
    231   -541    833    544   -588    991   -978    866   -567
    980    143   -254   -879    177   -155    769   -231    457

>> b = [165795; 354234; 867453; 521765; 298678; 983721; 765213; 456321; 874623]
b =
    165795
    354234
    867453
    521765
    298678
    983721
    765213
    456321
    874623

>> x=cramer(A,b)
ans =
    1042.90
    1032.51
   -379.07
     573.64
   -286.76
    1118.32
     267.47
   -128.91
     222.12

```

```
A = [234, 543, -896, -532, 587, -943, 908, -873, 874; 567, -674, 234, 154, 874, 735, 456, 312, -873; 678, 571, -675, -121, 834, -731, 583, -931, 743; 342, -421, -896, 687, 347, -121, 890, 873, -111; 907, -456, 654, 533, -111, 222, -888, 452, -984; 333, 523, 768, 544, -777, 234, -911, 900, -222; 451, 666, -905, -142, 905, -661, 809, -212, 453; 231, -541, 833, 544, -588, 991, -978, 866, -567; 980, 143, -254, -879, 177, -155, 769, -231, 457]
b = [165795; 354234; 867453; 521765; 298678; 983721; 765213; 456321; 874623]
cramer(A,b)
```

```
Ventana de comandos
>> A = [234, 543, -896, -532, 587, -943, 908, -873, 874; 567, -674, 234, 154, 874, 735, 456, 312, -873; 678, 571, -675, -121, 834, -731, 583, -931, 743; 342, -421, -896, 687, 347, -121, 890, 873, -111; 907, -456, 654, 533, -111, 222, -888, 452, -984; 333, 523, 768, 544, -777, 234, -911, 900, -222; 451, 666, -905, -142, 905, -661, 809, -212, 453; 231, -541, 833, 544, -588, 991, -978, 866, -567; 980, 143, -254, -879, 177, -155, 769, -231, 457]
A =

    234    543   -896   -532    587   -943    908   -873    874
    567   -674    234    154    874    735    456    312   -873
    678    571   -675   -121    834   -731    583   -931    743
    342   -421   -896    687    347   -121    890    873   -111
    907   -456    654    533   -111    222   -888    452   -984
    333    523    768    544   -777    234   -911    900   -222
    451    666   -905   -142    905   -661    809   -212    453
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b =

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    354234
    867453
    521765
    298678
    983721
    765213
    456321
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>> cramer(A,b)
ans =

    1042.90
    1032.51
   -379.07
     573.64
   -286.76
    1118.32
     267.47
   -128.91
     222.12
```

Conclusiones:

- Se comprendido los conceptos relacionados con ejecución de los ciclos (FOR) en Octave y afianzando así, nuestras habilidades en la programación

- La regla de Cramer no es eficiente en lo concierne a sistemas de ecuaciones complejos debido a **la complejidad temporal de el algoritmo**
- Se aprendió sobre la implementación y validación de la regla de Cramer en Octave
- Se comprobó la fiabilidad y exactitud del programa em la solución de sistemas de ecuaciones