————————EJERCICIO~2————————

(% i1) A: matrix([1.1,2.2,3.3,0,0,1.1,0.55,1.1],[2,5.2,6,1.2,1.2,3.2,2.2,2],[3,6,10.3,0.78,0,3.91,2.54,4.17], [0,1,0.6,2.76,3.8,2.82,4.28,1.94],[0,1,0,3,6.5,3,6.5,2],[1,3,3.7,2.42,3,5.09,15.26,15.43], [0.5,2,2.3,3.48,6,11.06,57.59,60.92],[1,2,3.9,1.54,2,10.63,60.22,69.61])$

(% i14) b:transpose([1, 0, -1, 0, -2, 1, 2, 2]);

(b)
$$\begin{pmatrix} 1 \\ 0 \\ -1 \\ 0 \\ -2 \\ 1 \\ 2 \\ 2 \end{pmatrix}$$

Programamos primero el método de Doolittle, y luego lo adaptamos a Crout

(% i5) N:matrix_size(A)[1];

(N) 8

(% i6) l:ident(N);

(l)
$$\begin{pmatrix} 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 \end{pmatrix}$$

(% i7) u:ident(N);

(u)
$$\begin{pmatrix} 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 \end{pmatrix}$$

(% i8) for i:1 thru N do(for j:i thru N do u[i, j]:transpose(A)[i,j]-sum(l[i,k]*u[k,j], k, 1, i-1),for j:i+1 thru N do l[j, i]:1/u[i,i]*(transpose(A)[j,i]-sum(l[j,k]*u[k, i], k, 1, i-1)));

(% o8) *done*

⟶ aux:u;

⟶ u:transpose(l);

⟶ l:transpose(aux);

Resolvemos ahora el sistema l.y = b

(% i15) y:makelist(0, i, 1, N);

(y) $[0, 0, 0, 0, 0, 0, 0, 0]$

(% i19) y[1]:b[1, 1]/l[1,1];

(y[1]) 0.9090909090909091

(% i22) for i:2 thru N do y[i]:1/l[i, i]*(b[i, 1]-sum(l[i, j]*y[j], j, 1, i-1));

(% o22) *done*

(% i23) y;
(% o23)
$[0.9090909090909091, -1.515151515151515, -2.867132867132861, 2.311022311022304, -3.404595404595392,$

$0.8137695637695634, -0.917366946778716, -2.351379557261914]$

(% i24) x:makelist(0, i, 1, N);

(x) $[0, 0, 0, 0, 0, 0, 0, 0]$

ahora resolvemos Ux=y

(% i25) x[N]:y[N]/u[N, N];

(x[N]) -2.351379557261914

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(% i26) for i:N-1 thru 1 step -1 do x[i]:1/u[i,i]*(y[i] - apply("+", makelist(u[i, j]*x[j], j,
        i+1, N)));

(% o26)                                done
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(% i32) solucion:x;
(solucion)
[41.34023019464165, −9.582148788031109, −9.739728735316927, 1.884874928992429, −4.838608015078577,

        9.58671774848256, 1.434012610483188, −2.351379557261914]
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