```
Quit[];

(* METODO DI GAUSS SEIDEL *)

(* Esempio 1. *)

n = 3;
a = {{7, 3, 1}, {2, -9, 4}, {1, -4, 12}};
b = {18, 12, 6};
x = Table[xx[i], {i, 1, n}];
MatrixForm[a]
Det[a]
MatrixForm[b]
sys = Thread[Dot[a, x] == b]
xsol = x /. Solve[sys, x][[1]] // N
```

$$\begin{pmatrix} 7 & 3 & 1 \\ 2 & -9 & 4 \\ 1 & -4 & 12 \end{pmatrix}$$

```
-703
```

$$\begin{pmatrix} 18 \\ 12 \\ 6 \end{pmatrix}$$

```
{7 xx[1] + 3 xx[2] + xx[3] == 18, 2 xx[1] - 9 xx[2] + 4 xx[3] == 12, xx[1] - 4 xx[2] + 12 xx[3] == 6}

{2.85917, -0.682788, 0.0341394}

Clear[eq, f, ff]

Do[eq[i] = Reduce[sys[[i]], xx[i]], {i, 1, n}];
Do[ff[i] = eq[i][[2]], {i, 1, n}];
f = Table[ff[i], {i, 1, n}]
```

$$\left\{\frac{18}{7} - \frac{3\,xx[2]}{7} - \frac{xx[3]}{7},\ -\frac{4}{3} + \frac{2\,xx[1]}{9} + \frac{4\,xx[3]}{9},\ \frac{1}{2} - \frac{xx[1]}{12} + \frac{xx[2]}{3}\right\}$$

```
xk[0] = Table[0.0, {i, 1, n}]
kmax = 100; tol = 1.0×10^(-6);
k = 0;
While[k < kmax,
 Do[
  sysold = Table[xx[j] == xk[k][[j]], {j, i + 1, n}];
  sysnew = Table[xx[j] == xtemp[j], {j, 1, i - 1}];
  sys1 = Join[sysnew, sysold];
  sol1 = Solve[sys1, x][[1]];
  (*Print[i,sysold,sysnew,sys1,sol1];*)
  xtemp[i] = f[[i]] /. sol1 // N;
  , {i, 1, n}];
 xk[k + 1] = Table[xtemp[i], {i, 1, n}];
 norm = Max[Abs[xk[k + 1] - xk[k]]]; Print[k, "  ", norm]; If[norm ≤ tol, Break[]];
 k++]
Print[xk[k]]

{0., 0., 0.}
```

Solve::svars : Equations may not give solutions for all "solve" variables. ≫

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General::stop : Further output of Solve::svars will be suppressed during this calculation. ≫

0 2.57143

1 0.321995

2 0.0369591

3 0.00310665

4 0.000418169

5 0.0000266333

6 5.19321×10^{-6}

7 1.60564×10^{-7}

{2.85917, −0.682788, 0.0341394}