

Gauss-Seidel Iteration with Relaxation

parameters:

N (in), number of unknowns, integer

A (in-out), $N \times (N+1)$ array of floating point numbers. First N columns give coefficients of equations, last column gives right-hand sides of equations.

approx (in-out), array of N floating point numbers sending original approximation to the algorithm and returning new approximation

lambda (in), float, relaxation factor between 0 and 2

nbrIterations (in), integer, number of iterations to be performed

```
for i:=1 to N loop -- set diagonal elements to 1
    divide each entry in row i by A[i,i];
end loop;
```

```
for count := 1 to nbrIterations loop
    for i := 1 to N loop
        newX := A[i,N+1] + A[i,i]*approx[i];
        for col := 1 to N loop
            subtract A[i,col]*approx[col] from sum;
        end for;
        approx[i] := lambda*newX + (1.0-lambda)*approx[i];
    end for;
end for;
```