

Aproximaciones

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Input

```
In [67]: Matrix = [
            [-5, 5, 3],
            [5, 6, 1],
            [3, 1, 7]
          ]
Independent = [1, 2, 3]
```

Method

```
In [68]: x = GaussSeidel(Matrix, Independent, 2000, 0.00000000001)
print(x)
```

3x3 System:

```
[-5 5 3 = 1]
[5 6 1 = 2]
[3 1 7 = 3]
```

```
x[0] = [-0.2, 0.5, 0.44285714285714284]
x[1] = [0.5657142857142856, -0.21190476190476185, 0.21639455782312927]
x[2] = [-0.2820680272108843, 0.5323242630385487, 0.4734114026563006]
x[3] = [0.616371104632329, -0.259211154302991, 0.20144254862942915]
x[4] = [-0.33834562512533356, 0.5817142628328732, 0.4904746589347325]
x[5] = [0.6759990581937128, -0.3117449916505494, 0.18339254529563015]
x[6] = [-0.40170946447317135, 0.6375257961783711, 0.5096575138915919]
x[7] = [0.7433203045133262, -0.37104317274303716, 0.16301175131472262]
x[8] = [-0.4732361219542036, 0.7005281430760492, 0.5313114603980802]
x[9] = [0.8193150193148973, -0.4379810928287612, 0.14000514784058135]
x[10] = [-0.5539780041244124, 0.7716474787969135, 0.5557552190823319]
x[11] = [0.9051006102463126, -0.5135430450523158, 0.11403445918762545]
x[12] = [-0.6451223695397407, 0.8519295647518463, 0.5833482205524823]
x[13] = [1.0019384970833358, -0.598840117661527, 0.0847178037730742]
```

Gauss-Seidel

```
In [32]: def GaussSeidel(m, it, n, e):
    print(len(m), "x", len(m), " System:\n", sep = "", end = "")
    for i in range(len(m)):
        print("\t", end = "")
        for j in range(len(m[i])):
            print(m[i][j], end = " ")
        print("=", it[i], "]", sep = "")
    print()
    x = [0 for _ in range(len(m))]
    for i in range(len(m)):
        d = m[i][i]
        for j in range(len(m[i])):
            m[i][j] /= d
        it[i] /= d

    for i in range(len(m)):
        s = it[i]
        for j in range(len(m[i])):
            if i != j:
                s -= m[i][j]*x[j]
        x[i] = s
    for _ in range(n):
        print("x[", _, "] = ", x, sep = "")
        c = 1
        for i in range(len(m)):
            o = x[i]
            s = it[i]
            for j in range(len(m[i])):
                if i != j:
                    s -= m[i][j]*x[j]
            x[i] = s
            if c and x[i]:
                error = 100*abs((x[i]-o)/x[i])
                if error > e:
                    c = 0
        if c: break;
    return x
```