Aproximaciones

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Input

In [83]:
```
"""
Matrix = [
    [3, -0.1, -0.2],
    [0.1, 7, -0.3],
    [0.3, -0.2, 10]
]
Independent = [7.85, -19.3, 71.4]
Matrix = [
    [2, -1, 4, 1, -1],
    [-1, 3, -2, -1, 2],
    [5, 1, 3, -4, 1],
    [3, -2, -2, -2, 3],
    [-4, -1, -5, 3, -4]
]
Independent = [7, 1, 33, 24, -49]
Matrix = [
    [1, 0.5, 1/3],
    [1, 2/3, 1/2],
    [1, 3/4, 3/5]
]
Independent = [1.833333, 2.166667, 2.35]
Matrix = [
    [1, 1],
    [1, -1]
]
Independent = [2, 0]
"""
Matrix = [
    [10, 2, -1],
    [-3, -6, 2],
    [1, 1, 5]
]
Independent = [27, -61.5, -21.5]
```

Method

In [84]:
```
x = GaussSeidel(Matrix, Independent, 2, 0.1)
print(x)
```

```
3x3 System:

        [10 2 -1 = 27]
        [-3 -6 2 = -61.5]
        [1 1 5 = -21.5]

x[0] = [2.7, 8.9, -6.62]
x[1] = [0.2579999999999999, 7.914333333333333, -5.934466666666666]
[0.5236866666666666, 8.010001111111112, -6.0067375555555556]
```

Gauss-Seidel

In [79]:
```
def GaussSeidel(m, it, n, e):
    print(len(m), "x", len(m), " System:\n", sep = "")
    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[0])):
                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
```