

```
from prettytable import PrettyTable
from math import *
```

```
def make_table(n): #Create method table
```

```
    table = PrettyTable()
    fields = ["i"]
    for i in range(n):
        fields.append("X{0}".format(i+1))
    fields.append("Max &") # & = delta
    table.field_names = fields
    return table
```

```
def norma2(x0, x1):
```

```
    summ = 0
    for i in range(len(x0)):
        summ += (x1[i] - x0[i])**2
    return summ**(0.5)
```

```
def make_row(i, x0, dispersion): #Create a row who will be added to the table
```

```
    row = [i]
    for k in range(len(x0)):
        row.append(x0[k])
    row.append(dispersion)
    return row
```

```
def list_subtraction(a,b): #Subtract the elements between two lists
```

```
    result = []
    for i in range(len(a)):
        result.append(abs(a[i] - b[i]))
    return result
```

```
def calculate_new_Sor( x0, a, b, w):
```

```
    result = []
    for i in range(len(x0)):
        result.append(x0[i])
    for i in range(0, len(a)):
        summ = 0
        for j in range(0, len(a)):
            if j != i:
                summ += a[i][j]*result[j]
        result[i] = (1 - w)*result[i] + (w/a[i][i])*(b[i] - summ)
    return result
```

```
def sor(a, b, x0, w, tol, niter):
```

```
    counter = 0
    dispersion = tol + 1
    x1 = []
    table = make_table(len(x0))
    table.add_row(make_row(counter, x0, "----"))
    while (dispersion > tol) and (counter < niter):
        x1 = calculate_new_Sor(x0, a, b, w)
        dispersion = norma2(x0, x1) #max(list_subtraction(x0, x1))
        x0 = x1
        counter += 1
        table.add_row(make_row(counter, x0, dispersion))
    if dispersion < tol:
        return table
    else:
        return table #"Failed in {0} iterations".format(counter)
```

```
def main():
```

```
    A = [[4,1,1,0,1],[-1,-3,1,1,0],[2,1,5,-1,-1],[-1,-1,-1,4,0],[0,2,-1,1,4]]
    b = [6,6,6,6,6]
    x0 = [0, 0, 0, 0, 0] #Aproximaci3n inicial
    w = 1.4
```

```
print(sor(A, b, x0, w, 10**-7, 100,))  
main()
```