TD Info 16

Corrigé Méthode du pivot de Gauss - 2

1.

$$M = \begin{pmatrix} 2 & -1 & 0 & \cdots & \cdots & \cdots & 0 \\ -1 & 2 & -1 & 0 & \cdots & \cdots & 0 \\ 0 & -1 & 2 & -1 & \cdots & \cdots & 0 \\ 0 & \cdots & \cdots & \ddots & \ddots & \ddots & \ddots \\ 0 & \cdots & \cdots & \cdots & \ddots & \ddots & \ddots \\ 0 & \cdots & \cdots & \cdots & \ddots & 2 & -1 \\ 0 & \cdots & \cdots & \cdots & \cdots & -1 & 2 \end{pmatrix} \quad F = \begin{pmatrix} f_0 \\ f_1 \\ f_2 \\ \vdots \\ \vdots \\ \vdots \\ f_{N-1} \end{pmatrix} \quad E = \begin{pmatrix} \eta_0 \\ \eta_1 \\ \eta_2 \\ \vdots \\ \vdots \\ \vdots \\ \eta_{N-1} \end{pmatrix}$$

2.

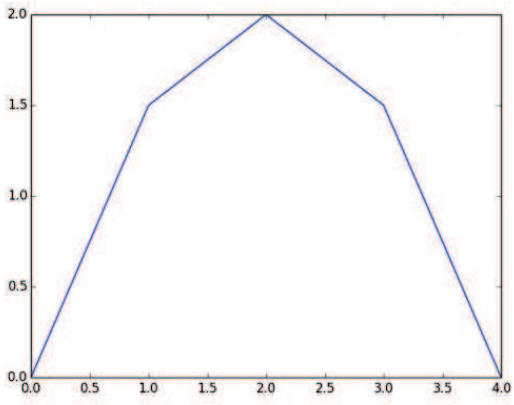
Python
```
M3 =[[2,-1,0],[-1,2,-1],[0,-1,2]]
F3 = [1,1,1]
```

3.

Python
```
>>> resolution (M3,F3)
[1.5, 2.0, 1.4999999999999998]
```

4.

Python
```
def profil_corde (M,F):
    """prend en argument les matrices M et F
    renvoie le graphe de l? allure de la corde"""
    x = [k for k in range(0,5)]
    Y = [0] + resolution (M,F) + [0]
    plt.plot(x,Y)
    plt.show()
```



5.

Python
```
def matrix_corde(N):
    """prend comme argument le nombre de masses N
    renvoie la matrice M associée au problème"""
    M =[[0]*n for k in range(N)]
    M[0][0] = M[N-1][N-1] = 2
    M[0][1] = M[N-1][N-2] = -1
    for k in range(1,N-1):
        M[k][k] = 2
        M[k][k+1] = -1
        M[k][k-1] = -1
    return M
```

6.

Python
```
def profil_corde_n(M,F):
    """prend en argument les matrices M et F
    renvoie le graphe de l?allure de la corde"""
    N = len(M)
    X = [k for k in range(0,N+2)]
    Y = [0] + resolution (M,F) + [0]
    plt.plot(X,Y)
    plt.show()
```

7.

Python
```
"""
Cas avec que des 1
"""
F = [[1] for k in range(25)]

"""
Cas contenant alternativement des 1 et des -0,95 en commençant par un 1
"""
F = [[0] for k in range(25)]
for k in range(25):
    if k%2 ==0:
        F[k][0] = 1
    else:
        F[k][0] = -0.95
```