```python
# centrale 2015-062-PSI  Proba

import random as rd
import numpy as np
import numpy.linalg as alg

def matriceA(n):
    A = np.zeros((n+1, n+1))
    for i in range(n+1):
        for j in range(i, n+1):
            A[i, j] = 1/(j+1)
    return A
vp = alg.eig(matriceA(2))

def k_tirages(k, n):
    L = []
    urne = n
    for indice in range(k):
        tirage = rd.randint(0, urne)
        L.append(tirage)
        urne = tirage
    return L

def calcule_Wk(k, n):
    W0 = np.zeros(n+1)
    W0[n] = 1
    A = matriceA(n)
    Wk = np.dot(alg.matrix_power(A, k), W0)
    return Wk

# B = [0, 1,...,n]
# E(Xk) = n / 2**k
```