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# -*- coding: utf-8 -*-

import numpy
import random
import math
from matplotlib.pyplot import *
import ising2D

'''valeur theorique de la temperature de Curie'''
Tc = 2.0/(math.asinh(1.0))

'''on execute notre fonction qui prend une valeur k qui est lie au nombre d'iteration de la boucle'''
'''et donc a la valeur max de T sachant que le pas est fixé a 0.1k'''
'''on va de 1kelvin a (1+0.1*k-1)kelvin'''

N = 30
def fox(k):
    M=np.ones(k-1)
    for i in range(0,k-1):
        ising = ising2D.Ising2D(N)
        ising.temperature(1+(0.1*i))
        (mi,Mi,dM)=ising.boucle(1000)
        print(mi)
        M[i]=Mi
    return M
M=fox(21)


'''des jeux de valeurs obtenus'''

M1=[ 0.99932111,0.99836861,  0.99701611,  0.99489139 , 0.99160444 , 0.98705167,
  0.97972222 , 0.97036139,  0.95754611 , 0.93823056 , 0.91144806 , 0.87130667,
  0.78990611 , 0.56608111,  0.22495639 , 0.10684556,  0.07126639 , 0.01653139,
  0.01311056 , 0.02070972]

T1=[ 1.        ,  1.10526316  ,1.21052632 , 1.31578947,  1.42105263 , 1.52631579,
  1.63157895,  1.73684211 , 1.84210526 , 1.94736842 , 2.05263158 , 2.15789474,
  2.26315789 , 2.36842105 , 2.47368421 , 2.57894737 , 2.68421053 , 2.78947368,
  2.89473684,  3.        ]

'''on plot'''

plot(T1,M1,'b')
xlabel("T (temperature)")
ylabel("M (moment magnetique)")
title("M(t)")
savefig("M(t)",format="png")
```