Prueba_Numeros_PseudoAleatorios

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1 Prueba Numeros PseudoAleatorios

[30]:

```
import numpy as np
import math as mt
import matplotlib.pyplot as plt

# Metodo Congruencias Lineales
def m_congruencias_lineales(x, a, c, mod, iters):
    num = 0.00
    lista =[]
    #print("Metodo de Congruencias Lineales")
    #print("  n  ", " Xo ", "     Un ", "  Xn+1")
    for i in range(iters):
        #print(" ", i,"   ", x,"  ", num,"   ", x)
        x = (a * x + c) % mod
        num = round(x/mod,2)
        lista.append(num)
    return lista

def get_pos(digs):
    val1 =0
    val2 =0
    if digs%2 !=0:
        val1 = int(digs/2)
        val2 = int(digs/2)+1
    else:
        val1 = int(digs/2)
        val2 = val1
    return val1,val2

def m_cuadrados_medios(iters, val, digs):
    lista =[]
    x0_semilla = int(val)
    aum = get_pos(digs)
    #print("ITERACIÓN", "Xn", "Xn*Xn", "Longitud","Ui","Rn")
    for i in range(iters):
        xn2= x0_semilla**2
        lon = len(str(xn2))
        ui = str(xn2)[int(lon/2)-aum[0]:int(lon/2)+aum[1]]
        rn = round(int(ui)/10**digs,2)
        #print(i, " ", x0_semilla," ",xn2, " ", lon, " ",ui, " ", rn)
        lista.append(rn)
        x0_semilla=int(ui)
    #print("   ")
    return lista

def lista_to_dict(num_grupos, aumento, lista):
    grupos = []
    ini=0.00
    for i in range(num_grupos+1):
        grupos.append(round(ini,2))
        ini=ini+aumento
    a=0
    b=1
    rangos={}
    for i in range(len(grupos)-1):
        inf=grupos[a]
        sup=grupos[b]
        rangos.update({str(inf)+"," +str(sup):[]})
        for i in lista:
            if i==0.00:
                if i >=inf and i <=sup:
                    rangos[str(inf)+","+str(sup)].append(i)
            else:
                if i >inf and i <=sup:
                    rangos[str(inf)+","+str(sup)].append(i)
        a=b
        b=a+1
    return rangos

def chi_cuadrado(lista, valor):
    n = int(mt.sqrt(len(lista)))
    dic = lista_to_dict(n,1/n, lista)
    suma = 0.00
    print(" Intervalo ", "      Ei ", "       Oi ", " (Oi-Ei)**2/Ei")
    for x, it in enumerate(dic.items()):
        f = ((len(it[1])-n)**2)/n
        suma+=f
        print(x, "         ", str(n)+"("+it[0]+")     ", len(it[1]),"     ", f)

    # Graficando Chi cuadrado
    plt.hist(lista)
    plt.ylabel('frequencia')
    plt.xlabel('valores')
    plt.title('Histograma Chi cuadrado')
    plt.show()

    print("")
    print("Suma: ",suma)
    if suma< valor:
        return True
    else:
        return False

def main():
    #Prueba Chi Cuadrado
    valor = 16.9

    print("Parte 1 CM")
    iters = 100
    digs = 7
    lista = m_cuadrados_medios(iters, 74731897457, digs)
    res=chi_cuadrado(lista,valor)
    print("Pasa: ",res)

    print("")
    print("Parte 2 CL")

    x = 7 #int(input("Introduce el valor de la semilla: (Xo)-> "))
    a = 74731897457 #int(input("Introduce el valor del multiplicador: (a)-> "))
    c = 37747318974 #int(input("Introduce el valor de la constante aditiva:␣
 ↪(b)-> "))
    m = 19 #int(input("Introduce el valor del modulo: (m)-> "))
    lista2 = m_congruencias_lineales(x,a,c,m,iters)
    res2 = chi_cuadrado(lista2,valor)
    print("Pasa: ",res2)

if __name__ == "__main__":
    main()
```

```
Parte 1 CM
 Intervalo        Ei         Oi    (Oi-Ei)**2/Ei
0           10(0.0,0.1)      11       0.1
1           10(0.1,0.2)      18       6.4
2           10(0.2,0.3)      12       0.4
3           10(0.3,0.4)      7       0.9
4           10(0.4,0.5)      13       0.9
5           10(0.5,0.6)      9       0.1
6           10(0.6,0.7)      7       0.9
7           10(0.7,0.8)      5       2.5
8           10(0.8,0.9)      8       0.4
```

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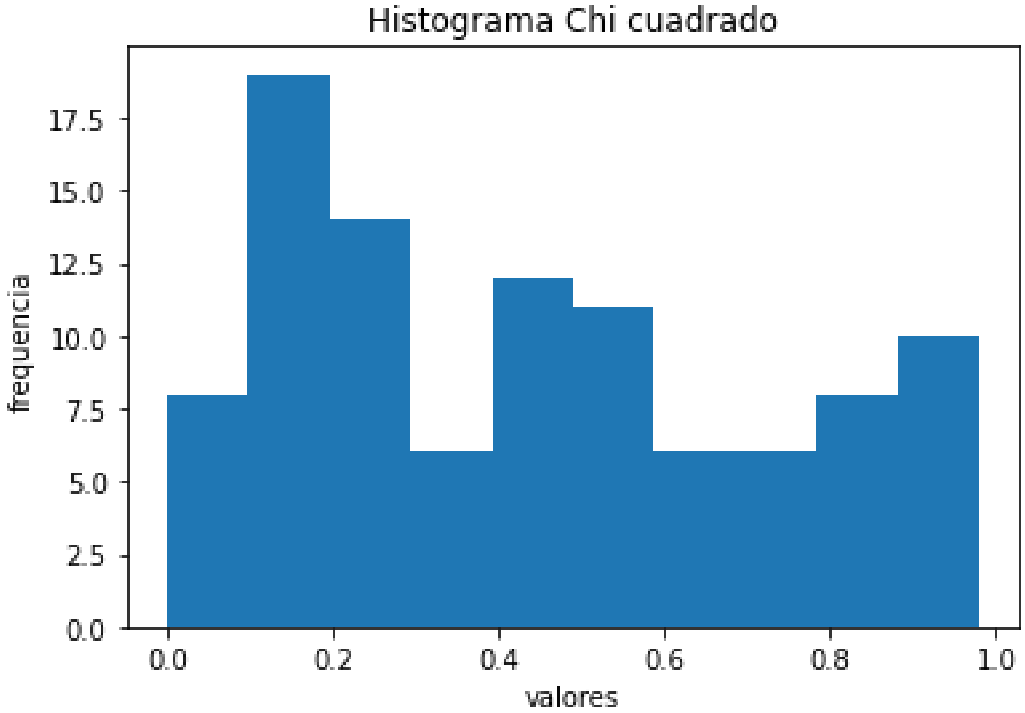
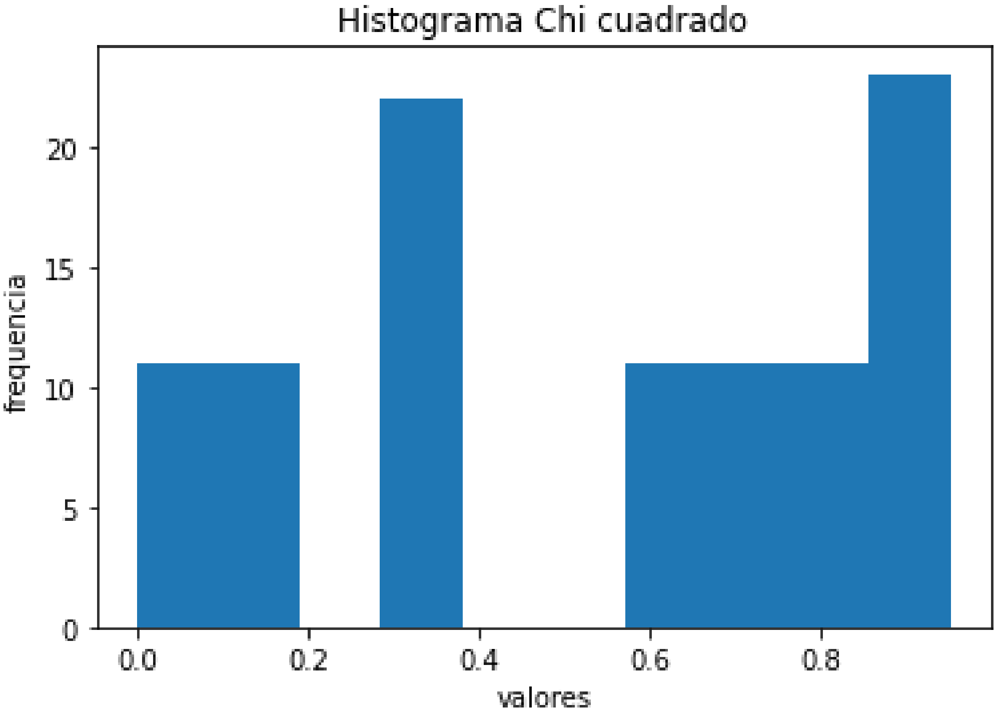
9          10(0.9,1.0)     10      0.0
```



```
Suma:  12.600000000000001
Pasa:  True

Parte 2 CL
 Intervalo       Ei        Oi   (Oi-Ei)**2/Ei
0          10(0.0,0.1)     11      0.1
1          10(0.1,0.2)     11      0.1
2          10(0.2,0.3)     0      10.0
3          10(0.3,0.4)     22      14.4
4          10(0.4,0.5)     0      10.0
5          10(0.5,0.6)     0      10.0
6          10(0.6,0.7)     11      0.1
7          10(0.7,0.8)     11      0.1
8          10(0.8,0.9)     23      16.9
9          10(0.9,1.0)     11      0.1
```



```
Suma:  61.800000000000004
Pasa:  False
```

1.1 Conclusiones

El metodo que genera numeros aleatorios adecuados para la practica es el de cuadrados medios, pero tambien se debe a los valores que se le pasen.

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[ ]:
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