KS-Test

```
from scipy import stats
import numpy as np
import matplotlib.pyplot as plt


# recovery times of patients who took medicine-1
r1 = [8.82420842, 7.47774471, 7.55712098, 7.98131439, 6.82771606,
       7.48566433, 9.15385732, 5.84040502, 8.26124313, 8.4728876 ,
       6.82582186, 7.00490974, 8.43423058, 6.72099932, 6.97495982,
       5.93748053, 5.40707847, 6.16385557, 6.71421056, 4.42396183,
       6.87285228, 8.00313581, 6.69035041, 7.83622942, 8.70984957,
       5.56284584, 9.08093437, 4.98165193, 7.67769408, 6.04738478,
       7.64921582, 7.31051639, 6.74463303, 7.27356973, 8.16787232,
       6.90990965, 7.06439167, 6.62921957, 6.08283539, 6.2458137 ,
       8.65173634, 5.76080646, 6.20573219, 8.91561004, 6.22560201,
       5.67542104, 6.97412435, 8.31354697, 8.14172701, 8.26099345,
       7.87612791, 6.24835109, 9.95324783, 6.59504627, 6.17365145,
       6.05676895, 7.23030223, 7.71311809, 7.37163804, 5.69798738,
       5.71056902, 7.94556876, 7.47234105, 6.85346234, 4.77892053,
       6.92631063, 6.10681151, 7.06277198, 7.18023164, 7.78285327,
       7.85500885, 6.54349161, 8.25949958, 6.44289198, 7.16705977,
       6.03517015, 7.61274786, 7.032845  , 6.78161745, 7.07917968,
       6.21549342, 5.34267439, 6.73039933, 7.70562561, 8.15117049,
       6.72564324, 6.68220904, 8.50359274, 7.52912703, 7.34572493,
       5.95734283, 6.58259396, 6.49394335, 8.68069592, 8.60547125,
       6.8905056 , 7.72575925, 6.84801609, 7.96999724, 7.10420915]


# recovery times of patietnts who took medicine-2
r2 = [ 9.56597358,  7.49291458,  8.73841824,  7.63523452,  4.12559277,
        7.3679259 ,  9.87873565,  6.14516559,  8.19923821,  7.30169992,
       10.24606417,  6.83814477,  7.01611267,  6.15716049,  8.29590714,
       12.3333305 ,  8.22144016,  6.06830071,  3.75820649,  6.69220157,
       10.08721618,  9.70580422,  7.31050006, 11.40145721,  5.64818498,
        7.38914449,  8.43740074,  6.3451435 ,  7.05694361,  8.1997151 ,
        9.03059061,  7.76904679,  6.92375578,  5.78318543,  8.99027781,
        7.56186529,  5.27095372,  8.32896688, 11.52935757,  7.08119961,
        9.48825066,  9.14072759,  7.30357663,  8.62183754, 10.40999814,
        8.70096763,  7.04645384,  6.378799  , 10.5098363 ,  7.36078888,
        7.33403615,  8.07396248,  6.18309499,  7.24668404,  9.03430611,
        8.99016584,  6.78606416,  8.436418  ,  6.85877947, 10.10405772,
        6.74943076,  7.57812376,  7.12920671,  9.38065269,  9.57139966,
        6.4484012 ,  6.93877043,  9.22141667,  8.34815638,  7.73980671,
        7.17840767,  9.27913457,  6.49963224,  9.92287292,  7.63978639,
        9.53931977,  9.02602273,  6.79374185,  8.59715131,  8.37747338,
        8.78161815,  6.78716383,  8.28473394,  8.20283798, 12.50518811,
       10.19772574,  8.93758457,  8.9540311 ,  8.28927558,  6.28935098,
        7.69447559,  9.66777701, 10.33898342,  8.71199578,  5.12781581,
        9.70954569,  9.13685031,  7.28989718,  8.0868909 ,  7.42937556,
        7.31356749,  9.92345816,  8.60211814,  9.33228465,  8.14132658,
```

```
        6.17871495, 10.28358242,  7.31898597,  7.95085527,  6.20331719,
        9.19119762,  6.98600628,  7.05314883, 10.57921482,  6.83637574,
        7.86199283,  8.23350975,  5.87625665,  7.78945364,  8.83612492]
```

```
d1 = np.array(r1)
d2 = np.array(r2)
```

```
n1 = len(d1)
n2 = len(d2)
```

```
n1
```

```
    100
```

```
n2
```

```
    120
```

```
#2-sample KS Test
stats.ks_2samp(d1, d2)
```

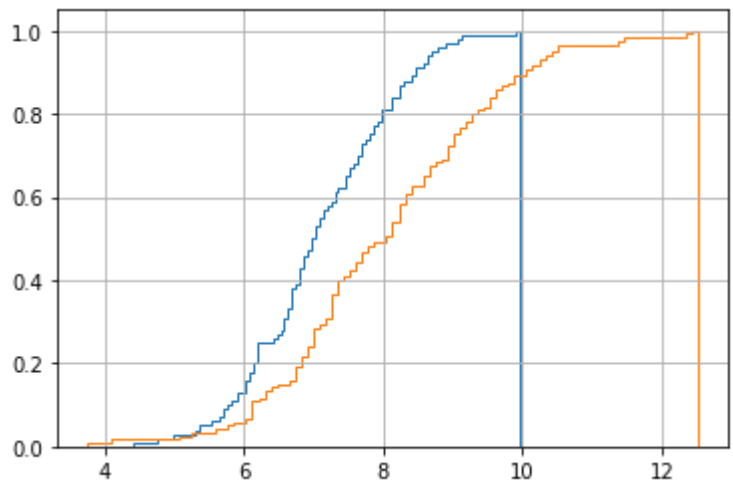
```
    Ks_2sampResult(statistic=0.3233333333333333, pvalue=1.516338798324135e-05)
```

p-value = 0.00001516 < 0.01 = alpha

=> Reject H0 (r1 and r2 same distribution)

=> Accept Ha (the distributions of r1 and r2 are different)

```
plt.grid()
a = plt.hist(d1, bins=100, cumulative=True, label='CDF', density=True, histtype='st
b = plt.hist(d2, bins=100, cumulative=True, label='CDF', density=True, histtype='st
plt.show()
```



Double-click (or enter) to edit

T-test & Z-test

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