$$T_n(Z) = -\frac{1}{n^2}\sum_{i,j=1}^{n}\ln(1+(X_i-Y_j)^2)+\frac{1}{n(n-1)}\sum_{i<j}^{n}\ln(1+(X_i-X_j)^2)+\frac{1}{n(n-1)}\sum_{i<j}^{n}\ln(1+(Y_i-Y_j)^2),$$

critical value of Tn simulation criterion calculated by 1'000'000 iterations,

$$formula = P(z > z_{1-\alpha/2}-\frac{h}{\sqrt{6\ln 3}})+P(z<-z_{1-\alpha/2}-\frac{h}{\sqrt{6\ln 3}}),\quad z\sim N(0,1),\quad 1/\sqrt{6\ln 3}\approx 0.389$$

Table 1: Power of tests for the Cauchy distribution,
$X \sim C(0,1)$, $Y \sim C(h/\sqrt{n},1)$,
samples size 500, 1000 iterations, 800 permutations in $T_n, perm$

h	$T_n, perm$	T_n, sim	$formula$	$wilcox.test$	$ks.test$
1	5.8	6.1	6.8	6.4	6.4
2	11.6	11.6	12.2	12.6	13.9
3	21	21.8	21.5	22.2	24.3
5	50.9	51	49.5	48	57.9
7	82.2	82.4	77.8	75.6	85.9
9	96.2	96.5	93.9	93.2	97.2

Table 2: Power of tests for the Cauchy distribution,
$X \sim C(0,1)$, $Y \sim C(h/\sqrt{n},1)$,
samples size 1000, 1000 iterations, 800 permutations in $T_n, perm$

h	$T_n, perm$	T_n, sim	$formula$	$wilcox.test$	$ks.test$
1	6.3	6	6.8	6.8	8.1
2	11.4	11.9	12.2	12.9	13.4
3	21	20.9	21.5	22.8	26.2
4	34.9	34.6	34.4	36.1	43
7	84	84.5	77.8	79.5	87.6
10	99	98.9	97.4	96.8	99.2

Table 3: Power of tests for the Cauchy distribution,
$X \sim C(0,1)$, $Y \sim C(0, 1 + h/\sqrt{n})$,
samples size 100, 1000 iterations, 800 permutations in $T_n, perm$

h	$T_n, perm$	T_n, sim	$wilcox.test$	$ks.test$
2	0.106	0.119	0.054	0.054
4	0.276	0.298	0.055	0.087
6	0.494	0.536	0.055	0.159
8	0.688	0.735	0.055	0.25
10	0.842	0.871	0.052	0.364

Table 4: Power of tests for the Cauchy distribution,
$X \sim C(0,1)$, $Y \sim C(0, 1 + h/\sqrt{n})$,
samples size 500, 1000 iterations, 800 permutations in $T_n, perm$

h	$T_n, perm$	T_n, sim	$wilcox.test$	$ks.test$
2	0.094	0.1	0.045	0.063
4	0.285	0.306	0.048	0.14
6	0.545	0.565	0.05	0.261
8	0.795	0.805	0.052	0.433
10	0.93	0.94	0.052	0.622

Table 5: Power of tests for the Cauchy distribution,
$X \sim C(0,1)$, $Y \sim C(0, 1 + h/\sqrt{n})$,
samples size 1000, 1000 iterations, 800 permutations in $T_n, perm$

h	$T_n, perm$	T_n, sim	$wilcox.test$	$ks.test$
2	0.102	0.105	0.05	0.076
4	0.324	0.338	0.052	0.138
6	0.611	0.628	0.052	0.279
8	0.848	0.856	0.052	0.474
10	0.961	0.971	0.054	0.679