

$$L_1(Z) = \sum_{i,j=1}^n \ln(1 + |X_i - Y_j|), \quad (1)$$

$$L_2(Z) = \sum_{i,j=1}^n \ln(1 + |X_i - Y_j|^2), \quad (2)$$

$$L_\infty(Z) = \sum_{i,j=1}^n \ln(|X_i - Y_j|), \quad (3)$$

$$LL_{distribution} = \text{maximum log likelihood permutation criterion based on the distribution} \quad (4)$$

Таблица 1: Мощность тестов для Нормального распределения, размер выборок  $n = 50, 1000$  итераций, 800 перестановок в каждой итерации

$F_2$	$L_1$	$L_2$	$L_\infty$	$LL_{norm}$	$LL_{cauchy}$	$LL_{laplace}$	$LL_{levy}$	wilcox.test	ks.test
N(0, 1)	5.2	5.4	4.5	5.2	5.6	5.8	4.9	5.4	4.3
N(0.25, 1)	19.4	21.8	15	19.5	15.6	17.5	5	23.4	16.5
N(0.5, 1)	62.7	66.5	50.6	62.3	49.1	53.5	6.7	70	53.2
N(0.75, 1)	93.9	95.2	86.7	93.7	83.9	89.6	7.5	96.5	90.1
N(1, 1)	98.9	99.1	98.4	98.9	97.5	98.5	9	99.4	98.7
N(0, 1.5)	35.7	33.2	33.8	69.9	20.8	39.3	14.6	5.5	11.2
N(0, 2)	89.5	89.9	84.3	99.1	68.8	91.4	26.2	5.9	37
N(0, 2.5)	99.3	99.4	97.7	100	93.6	99.8	34.2	6.3	69
N(0, 3)	100	100	100	100	99.3	100	41.4	6.8	89.2
N(0.25, 1.25)	24.5	25.3	20.2	38.6	19.2	26.1	7.6	18.9	16.5
N(0.5, 1.5)	74.2	75.4	63.7	89.2	51.8	71.8	10.7	48.2	54.2
N(0.75, 1.75)	95.9	96.3	91.8	98.9	86	95.4	13.2	73	84.1
N(1, 2)	99.5	99.6	98.2	100	95.9	99.3	16.1	86.7	96
N(0.25, 1.5)	47	46.5	41.2	76.1	32	49.5	12.3	17.1	23.2
N(0.5, 2)	95	95.8	91.1	99.6	82.3	95.8	21.8	34.7	68.1
N(0.75, 2.5)	99.8	99.9	98.7	100	96.8	99.8	29.9	49.5	91.1
N(1, 3)	100	100	100	100	99.7	100	35.8	58.1	98.2

Таблица 2: Мощность тестов для распределения Коши, размер выборок  $n = 50, 1000$  итераций, 800 перестановок в каждой итерации

$F_2$	$L_1$	$L_2$	$L_\infty$	$LL_{norm}$	$LL_{cauchy}$	$LL_{laplace}$	$LL_{levy}$	wilcox.test	ks.test
C(0, 1)	5	5	5.1	5.4	4.9	5.1	4.5	5	4.3
C(0.25, 1)	10.7	10.5	10.7	5.5	11.3	5.9	4.4	10.9	10.3
C(0.5, 1)	28.4	26.7	27.6	5.5	30	7.5	4.4	28.9	30
C(0.75, 1)	56	53.7	55.6	5.8	61.1	10.1	4	52.2	57.1
C(1, 1)	80.7	79.6	80.6	6.3	85.3	14.6	4.5	74.6	79.9
C(0, 1.5)	22.7	21.7	22.2	11.2	22.9	13.9	6	5.5	9.8
C(0, 2)	54.7	53	53.7	18.8	60.5	28.1	7.9	6	19.6
C(0, 2.5)	80.6	79.8	79.9	24.7	84.7	40.9	10.1	6.4	31.8
C(0, 3)	92.2	92.3	91.8	32.8	95.2	52.5	11.4	6.6	49.4
C(0.25, 1.25)	15	13.9	14	6.9	15.4	9	4.8	9.5	10.8
C(0.5, 1.5)	38.1	38.8	36.9	11.3	42.4	15.5	5.6	20.9	27.2
C(0.75, 1.75)	64.6	63.8	63.5	15.7	70.3	23.6	6.8	33.5	48.1
C(1, 2)	83.3	82	82.2	19.2	86.9	32.4	7.7	45.5	66.2
C(0.25, 1.5)	26.4	25.3	26.5	11.4	29	14.7	5.8	9	12.8
C(0.5, 2)	64.6	64.6	63.2	19.1	70.9	29.1	7.3	16.8	34.3
C(0.75, 2.5)	87.2	86.2	86.2	25.2	90	43.2	10.1	23.9	57.3
C(1, 3)	96.7	96.8	96.1	33.5	97.1	55.3	11.6	30	72.3

Таблица 3: Мощность тестов для распределения Лапласа,  
размер выборок  $n = 50, 10000$  итераций, 1600 перестановок в  
каждой итерации

$F_2$	$L_1$	$L_2$	$L_\infty$	$LL_{norm}$	$LL_{cauchy}$	$LL_{laplace}$	$LL_{levy}$	wilcox.test	ks.test
La(0, 1)	5.5	5.6	5.1	5	5	5.2	5	5.5	4.1
La(0.25, 1)	18	17.8	16.3	9.3	18.8	17.2	5.1	19.1	17.2
La(0.5, 1)	54.6	53.6	49.9	23.7	56.8	53.6	5.4	55.3	54.1
La(0.75, 1)	87	86.7	83	51.3	87.8	86.6	5.8	87.3	86.3
La(1, 1)	98.3	98.2	97.1	78.8	98.3	98.2	5.8	98	98.1
La(0, 1.5)	28.1	28	25.3	44.3	24.8	41.8	10	5.7	9.4
La(0, 2)	72.1	72.8	65.6	87.5	64.2	87.2	17	5.9	22.8
La(0, 2.5)	94	94.5	90.4	98.4	89.4	98.6	23.6	6.3	41.9
La(0, 3)	99.1	99.2	97.8	99.8	97.3	99.9	28.6	6.5	61.4
La(0.25, 1.25)	22.2	21.8	20.3	21.1	22.1	26.1	6.4	16.3	16.5
La(0.5, 1.5)	61	60.6	56.2	56	59.6	69.6	8.8	39.6	45.7
La(0.75, 1.75)	88.2	88.3	84.4	83.9	86.6	92.9	11.1	61.9	73.4
La(1, 2)	97.7	97.8	96.3	95.6	96.6	98.9	13.5	78.2	89.8
La(0.25, 1.5)	37.8	37.7	34	47.3	34.4	49.9	9.5	14.2	19.2
La(0.5, 2)	84.4	84.8	80.2	90.3	80	93	15.3	30	51.5
La(0.75, 2.5)	98.3	98.5	96.9	99	96.6	99.7	20.8	43.9	77.3
La(1, 3)	99.9	99.9	99.7	99.9	99.6	100	25.7	54.5	91.6

Таблица 4: Мощность тестов для распределения Леви,  
размер выборок  $n = 50, 1000$  итераций, 800 перестановок в каж-  
дой итерации

$F_2$	$L_1$	$L_2$	$L_\infty$	$LL_{norm}$	$LL_{cauchy}$	$LL_{laplace}$	$LL_{levy}$	wilcox.test	ks.test
Le(0, 1)	5.5	5.7	5.8	5.6	5.8	5.6	6.2	4.6	4.7
Le(0.25, 1)	7.1	6.9	13.8	5.6	6.1	5.5	65.3	10.1	8.5
Le(0.5, 1)	16.2	10.8	45.9	5.6	10.7	5.5	98.9	22.7	36.8
Le(0.75, 1)	41	27.8	81.8	5.6	23.3	5.7	100	38.7	74.5
Le(1, 1)	69.3	53.2	94.9	5.6	43.8	5.7	100	51.9	92.3
Le(0, 1.5)	13.4	12.7	15.6	6.9	14.3	6.7	22.9	20.5	13.4
Le(0, 2)	32.9	31.5	40.7	7.3	35	8.9	57.5	48.2	37.9
Le(0, 2.5)	54.3	52.3	64.3	8.5	53.4	10.4	81.9	69.5	61.1
Le(0, 3)	71.8	69.7	81.1	9.5	70.8	12.2	93	84.3	77.9
Le(0.25, 1.25)	12.8	11.2	22.3	6.7	11.2	5.7	75.5	22.4	17.7
Le(0.5, 1.5)	37.6	32.1	67.6	6.8	30.6	6.8	99.3	54.6	64
Le(0.75, 1.75)	72.3	64.8	92.6	6.9	52.2	7.6	100	75.1	90.2
Le(1, 2)	90	85.4	97.9	7.3	73.4	8.9	100	89.2	97.3
Le(0.25, 1.5)	21.3	19.5	35.4	6.9	20.7	6.8	82.7	37.4	30.8
Le(0.5, 2)	63.7	57.4	84.7	7.3	50.2	8.9	99.6	73.8	82
Le(0.75, 2.5)	89.2	86.6	97.2	8.5	77.4	10.6	100	92	96.3
Le(1, 3)	97.4	96.8	99.5	9.5	88.9	12.6	100	96.7	99.4

Таблица 5: Мощность тестов для распределения Лог-Коши,  
размер выборок  $n = 50, 1000$  итераций, 800 перестановок в каж-  
дой итерации

$F_2$	$L_1$	$L_2$	$L_\infty$	$LL_{norm}$	$LL_{cauchy}$	$LL_{laplace}$	$LL_{levy}$	$LL_{logcauchy}$	wilcox.test	ks.test
LC(0, 1)	6.7	6.4	6.9	4.4	6	4.6	4.2	5.8	4.8	4.5
LC(0.25, 1)	9.4	9.2	8.9	4.7	12.3	4.9	6.6	11.7	8.6	9.8
LC(0.5, 1)	21.4	20.6	24	4.9	38.3	5.8	12	32.7	27.6	30
LC(0.75, 1)	42.4	41.6	48.2	5.8	68	6.5	23.2	63.1	53	58.5
LC(1, 1)	66.6	65.6	72.4	6.1	88	7.2	34	85.7	75	80.7
LC(0, 1.5)	15.2	14.2	17.3	8.7	11.9	9.2	6.6	24.9	5.1	9.5
LC(0, 2)	30.4	28.3	39.8	15.1	21.2	16.1	13.6	58.6	5.1	20.6
LC(0, 2.5)	45.7	42.3	61	19.9	33.6	21	22	84.2	5.7	32.4
LC(0, 3)	57.8	54.7	77.6	24.1	43.5	26	34	92.6	5.7	47.1
LC(0.25, 1.25)	12.9	13.3	11.3	6.8	12.9	7.1	4.4	16.1	7.9	10.6
LC(0.5, 1.5)	28.1	28.2	29.4	10.2	34	10.9	6.5	44.1	19.2	26.2
LC(0.75, 1.75)	47.6	47.7	48.7	13.8	56.6	15.4	8.3	68.9	32.4	47.9
LC(1, 2)	64	64.2	66.3	18.3	72.9	19.9	10.6	86.4	44.4	67
LC(0.25, 1.5)	19.7	18.9	18.9	9.2	16.1	10.5	5.1	28.9	7.7	12.9
LC(0.5, 2)	41.8	41.3	47	16.4	39.9	17.7	8.3	69.9	14.6	33.4
LC(0.75, 2.5)	63.8	62.9	70.6	21.9	57.8	23.1	13.7	90.5	22.1	56.1
LC(1, 3)	78.4	77.4	84.8	27.2	70.8	28.1	19.2	97.1	27.4	71.9