

GLIMMPSE Validation Report:

GLMM(F) Example 4. Power and confidence limits for a univariate model

Authors: Sarah Kreidler

Run Date: 2012/12/05 12:47:44

1. Introduction

The following report contains validation results for the JavaStatistics library, a component of the GLIMMPSE software system. For more information about GLIMMPSE and related publications, please visit

<http://samplesizeshop.org>.

The automated validation tests shown below compare power values produced by the JavaStatistics library to published results and also to simulation. Sources for published values include POWERLIB (Johnson *et al.* 2007) and a SAS IML implementation of the methods described by Glueck and Muller (2003).

Validation results are listed in Section 3 of the report. Timing results show the calculation and simulation times for the overall experiment and the mean times per power calculation. Summary statistics show the maximum absolute deviation between the power value calculated by the JavaStatistics library and the results obtained from SAS or via simulation. The table in Section 3.3 shows the deviation values for each individual power comparison. Deviations larger than 10^{-6} from SAS power values and 0.05 for simulated power values are displayed in red.

2. Study Design

The study design for Example 4 is a balanced two group design. We calculate power for a two-sample t-test comparing the mean response between the groups. We calculate confidence limits for the power values. The example is based on Figure 1 from

Taylor, D. J., & Muller, K. E. (1995). Computing Confidence Bounds for Power and Sample Size of the General Linear Univariate Model. *The American Statistician*, 49(1), 43-47.

2.1. Inputs to the Power Calculation

2.1.1. List Inputs

Type I error rates

0.0100000

Beta scale values

0.0000000, 0.0100000, 0.0200000, 0.0300000, 0.0400000, 0.0500000, 0.0600000, 0.0700000, 0.0800000, 0.0900000, 0.1000000, 0.1100000, 0.1200000, 0.1300000, 0.1400000, 0.1500000, 0.1600000, 0.1700000, 0.1800000, 0.1900000, 0.2000000, 0.2100000, 0.2200000, 0.2300000, 0.2400000, 0.2500000, 0.2600000, 0.2700000, 0.2800000, 0.2900000, 0.3000000, 0.3100000, 0.3200000, 0.3300000, 0.3400000, 0.3500000, 0.3600000, 0.3700000, 0.3800000, 0.3900000, 0.4000000, 0.4100000, 0.4200000, 0.4300000, 0.4400000, 0.4500000, 0.4600000, 0.4700000, 0.4800000, 0.4900000,

0.5000000, 0.5100000, 0.5200000, 0.5300000, 0.5400000, 0.5500000, 0.5600000, 0.5700000, 0.5800000, 0.5900000, 0.6000000, 0.6100000, 0.6200000, 0.6300000, 0.6400000, 0.6500000, 0.6600000, 0.6700000, 0.6800000, 0.6900000, 0.7000000, 0.7100000, 0.7200000, 0.7300000, 0.7400000, 0.7500000

Sigma scale values

1.0000000

Per group sample size values

12

Statistical tests

UNIREP

Power methods

cond

2.1.2. Matrix Inputs

$$E_s(\mathbf{X})_{(2 \times 2)} = \begin{bmatrix} 1.0000 & 0.0000 \\ 0.0000 & 1.0000 \end{bmatrix}$$

$$\mathbf{B}_{(2 \times 1)} = \begin{bmatrix} 0.0000 \\ 0.7500 \end{bmatrix}$$

$$\mathbf{C}_{(1 \times 2)} = [1.0000 \quad -1.0000]$$

$$\mathbf{U}_{(1 \times 1)} = [1.0000]$$

$$\Theta_0_{(1 \times 1)} = [0.0000]$$

$$\Sigma_E_{(1 \times 1)} = [0.0680]$$

3. Validation Results

A total of 228 power values were computed for this experiment.

3.1. Timing

	Total Time (seconds)	Mean Time (seconds)
Calculation	0.0000000	0.00E0
Simulation	41.3070000	1.81E-1

3.2. Summary Statistics

Max deviation from SAS	0.00000095
Max deviation from lower CI limit	0.00000091
Max deviation from upper CI limit	0.00000088
Max deviation from simulation	0.00575844

3.3. Full Validation Results

Power	CI	SAS Power (deviation)	SAS CI (deviation)	Sim Power (deviation)	Test	Sigma Scale	Beta Scale	Total N	Alpha
0.0100000	(0.0100000, 0.0100000)	0.0100000 (0.0000000)	(0.0100000, 0.0100000) {0.0000000, 0.0000000}	0.0104000 (0.0004000)	UNIREP	1.0000000	0.0000000	24	0.0100000
0.0102836	(0.0101414, 0.0104749)	0.0102836 (0.0000000)	(0.0101414, 0.0104749) {0.0000000, 0.0000000}	0.0101000 (0.0001836)	UNIREP	1.0000000	0.0100000	24	0.0100000
0.0111428	(0.0105677, 0.0119211)	0.0111422 (0.0000006)	(0.0105676, 0.0119211) {0.0000001, 0.0000000}	0.0111000 (0.0000428)	UNIREP	1.0000000	0.0200000	24	0.0100000
0.0125988	(0.0112851, 0.0144031)	0.0125988 (0.0000000)	(0.0112843, 0.0144028) {0.0000008, 0.0000003}	0.0125000 (0.0000988)	UNIREP	1.0000000	0.0300000	24	0.0100000
0.0146918	(0.0123012, 0.0180247)	0.0146914 (0.0000004)	(0.0123011, 0.0180247) {0.0000000, 0.0000001}	0.0140000 (0.0006918)	UNIREP	1.0000000	0.0400000	24	0.0100000
0.0174724	(0.0136315, 0.0229299)	0.0174724 (0.0000000)	(0.0136313, 0.0229294) {0.0000002, 0.0000004}	0.0156000 (0.0018724)	UNIREP	1.0000000	0.0500000	24	0.0100000
0.0210076	(0.0152925, 0.0292928)	0.0210074 (0.0000002)	(0.0152918, 0.0292927) {0.0000007, 0.0000001}	0.0182000 (0.0028076)	UNIREP	1.0000000	0.0600000	24	0.0100000
0.0253753	(0.0173029, 0.0373179)	0.0253744 (0.0000010)	(0.0173029, 0.0373175) {0.0000000, 0.0000004}	0.0231000 (0.0022753)	UNIREP	1.0000000	0.0700000	24	0.0100000
0.0306619	(0.0196883, 0.0472262)	0.0306618 (0.0000001)	(0.0196882, 0.0472261) {0.0000001, 0.0000001}	0.0278000 (0.0028619)	UNIREP	1.0000000	0.0800000	24	0.0100000
0.0369672	(0.0224747, 0.0592511)	0.0369668 (0.0000004)	(0.0224744, 0.0592508) {0.0000004, 0.0000003}	0.0349000 (0.0020672)	UNIREP	1.0000000	0.0900000	24	0.0100000
0.0443930	(0.0256910, 0.0736229)	0.0443929 (0.0000000)	(0.0256910, 0.0736228) {0.0000000, 0.0000001}	0.0412000 (0.0031930)	UNIREP	1.0000000	0.1000000	24	0.0100000
0.0530477	(0.0293700, 0.0905603)	0.0530476 (0.0000002)	(0.0293699, 0.0905601) {0.0000001, 0.0000002}	0.0509000 (0.0021477)	UNIREP	1.0000000	0.1100000	24	0.0100000
0.0630393	(0.0335455, 0.1102546)	0.0630388 (0.0000005)	(0.0335453, 0.1102537) {0.0000002, 0.0000008}	0.0600000 (0.0030393)	UNIREP	1.0000000	0.1200000	24	0.0100000

0.0744722	(0.0382534, 0.1328546)	0.0744721 (0.0000001)	(0.0382529, 0.1328544) {0.0000005, 0.0000002}	0.0713000 (0.0031722)	UNIREP	1.0000000	0.1300000	24	0.0100000
0.0874473	(0.0435301, 0.1584598)	0.0874471 (0.0000002)	(0.0435300, 0.1584592) {0.0000000, 0.0000006}	0.0837000 (0.0037473)	UNIREP	1.0000000	0.1400000	24	0.0100000
0.1020538	(0.0494146, 0.1870997)	0.1020532 (0.0000005)	(0.0494145, 0.1870996) {0.0000001, 0.0000001}	0.0982000 (0.0038538)	UNIREP	1.0000000	0.1500000	24	0.0100000
0.1183667	(0.0559448, 0.2187317)	0.1183666 (0.0000001)	(0.0559445, 0.2187313) {0.0000002, 0.0000004}	0.1153000 (0.0030667)	UNIREP	1.0000000	0.1600000	24	0.0100000
0.1364461	(0.0631586, 0.2532282)	0.1364459 (0.0000002)	(0.0631581, 0.2532281) {0.0000005, 0.0000001}	0.1323000 (0.0041461)	UNIREP	1.0000000	0.1700000	24	0.0100000
0.1563294	(0.0710924, 0.2903781)	0.1563289 (0.0000005)	(0.0710924, 0.2903779) {0.0000000, 0.0000003}	0.1520000 (0.0043294)	UNIREP	1.0000000	0.1800000	24	0.0100000
0.1780291	(0.0797828, 0.3298849)	0.1780291 (0.0000001)	(0.0797827, 0.3298842) {0.0000001, 0.0000007}	0.1749000 (0.0031291)	UNIREP	1.0000000	0.1900000	24	0.0100000
0.2015335	(0.0892628, 0.3713721)	0.2015333 (0.0000002)	(0.0892626, 0.3713720) {0.0000002, 0.0000002}	0.1982000 (0.0033335)	UNIREP	1.0000000	0.2000000	24	0.0100000
0.2268000	(0.0995629, 0.4143974)	0.2267995 (0.0000005)	(0.0995624, 0.4143970) {0.0000004, 0.0000004}	0.2282000 (0.0014000)	UNIREP	1.0000000	0.2100000	24	0.0100000
0.2537552	(0.1107101, 0.4584605)	0.2537551 (0.0000001)	(0.1107092, 0.4584604) {0.0000009, 0.0000001}	0.2562000 (0.0024448)	UNIREP	1.0000000	0.2200000	24	0.0100000
0.2822973	(0.1227259, 0.5030258)	0.2822971 (0.0000002)	(0.1227258, 0.5030255) {0.0000001, 0.0000003}	0.2845000 (0.0022027)	UNIREP	1.0000000	0.2300000	24	0.0100000
0.3122924	(0.1356303, 0.5475384)	0.3122919 (0.0000004)	(0.1356301, 0.5475378) {0.0000002, 0.0000006}	0.3145000 (0.0022076)	UNIREP	1.0000000	0.2400000	24	0.0100000
0.3435774	(0.1494351, 0.5914453)	0.3435773 (0.0000001)	(0.1494347, 0.5914451) {0.0000004, 0.0000002}	0.3460000 (0.0024226)	UNIREP	1.0000000	0.2500000	24	0.0100000
0.3759646	(0.1641469, 0.6342187)	0.3759644 (0.0000002)	(0.1641461, 0.6342184) {0.0000007, 0.0000003}	0.3815000 (0.0055354)	UNIREP	1.0000000	0.2600000	24	0.0100000
0.4092416	(0.1797646, 0.6753711)	0.4092412 (0.0000004)	(0.1797645, 0.6753704) {0.0000001, 0.0000007}	0.4150000 (0.0057584)	UNIREP	1.0000000	0.2700000	24	0.0100000
0.4431773	(0.1962832, 0.7144727)	0.4431765 (0.0000007)	(0.1962830, 0.7144725) {0.0000002, 0.0000002}	0.4482000 (0.0050227)	UNIREP	1.0000000	0.2800000	24	0.0100000
0.4775252	(0.2136879, 0.7511676)	0.4775251 (0.0000002)	(0.2136875, 0.7511673) {0.0000003, 0.0000004}	0.4830000 (0.0054748)	UNIREP	1.0000000	0.2900000	24	0.0100000

0.5120327	(0.2319570, 0.7851775)	0.5120324 (0.0000003)	(0.2319564, 0.7851773) {0.0000006, 0.0000001}	0.5151000 (0.0030673)	UNIREP	1.0000000	0.3000000	24	0.0100000
0.5464413	(0.2510605, 0.8163103)	0.5464407 (0.0000006)	(0.2510605, 0.8163101) {0.0000001, 0.0000002}	0.5507000 (0.0042587)	UNIREP	1.0000000	0.3100000	24	0.0100000
0.5804950	(0.2709628, 0.8444579)	0.5804949 (0.0000001)	(0.2709627, 0.8444575) {0.0000002, 0.0000004}	0.5825000 (0.0020050)	UNIREP	1.0000000	0.3200000	24	0.0100000
0.6139478	(0.2916189, 0.8695925)	0.6139475 (0.0000002)	(0.2916186, 0.8695924) {0.0000003, 0.0000001}	0.6145000 (0.0005522)	UNIREP	1.0000000	0.3300000	24	0.0100000
0.6465654	(0.3129767, 0.8917612)	0.6465649 (0.0000004)	(0.3129763, 0.8917609) {0.0000004, 0.0000002}	0.6437000 (0.0028654)	UNIREP	1.0000000	0.3400000	24	0.0100000
0.6781323	(0.3349775, 0.9110732)	0.6781316 (0.0000007)	(0.3349768, 0.9110728) {0.0000007, 0.0000004}	0.6752000 (0.0029323)	UNIREP	1.0000000	0.3500000	24	0.0100000
0.7084547	(0.3575547, 0.9276901)	0.7084545 (0.0000002)	(0.3575546, 0.9276895) {0.0000001, 0.0000006}	0.7044000 (0.0040547)	UNIREP	1.0000000	0.3600000	24	0.0100000
0.7373668	(0.3806382, 0.9418120)	0.7373665 (0.0000003)	(0.3806380, 0.9418118) {0.0000002, 0.0000002}	0.7331000 (0.0042668)	UNIREP	1.0000000	0.3700000	24	0.0100000
0.7647294	(0.4041504, 0.9536672)	0.7647289 (0.0000005)	(0.4041501, 0.9536669) {0.0000003, 0.0000003}	0.7590000 (0.0057294)	UNIREP	1.0000000	0.3800000	24	0.0100000
0.7904330	(0.4280098, 0.9634974)	0.7904328 (0.0000001)	(0.4280092, 0.9634970) {0.0000005, 0.0000004}	0.7851000 (0.0053330)	UNIREP	1.0000000	0.3900000	24	0.0100000
0.8144004	(0.4521302, 0.9715484)	0.8144001 (0.0000002)	(0.4521301, 0.9715483) {0.0000001, 0.0000001}	0.8093000 (0.0051004)	UNIREP	1.0000000	0.4000000	24	0.0100000
0.8365832	(0.4764247, 0.9780622)	0.8365829 (0.0000003)	(0.4764245, 0.9780620) {0.0000002, 0.0000002}	0.8343000 (0.0022832)	UNIREP	1.0000000	0.4100000	24	0.0100000
0.8569626	(0.5008026, 0.9832677)	0.8569621 (0.0000005)	(0.5008024, 0.9832674) {0.0000003, 0.0000003}	0.8553000 (0.0016626)	UNIREP	1.0000000	0.4200000	24	0.0100000
0.8755463	(0.5251731, 0.9873770)	0.8755462 (0.0000001)	(0.5251727, 0.9873766) {0.0000004, 0.0000004}	0.8731000 (0.0024463)	UNIREP	1.0000000	0.4300000	24	0.0100000
0.8923685	(0.5494452, 0.9905811)	0.8923682 (0.0000002)	(0.5494446, 0.9905809) {0.0000006, 0.0000001}	0.8887000 (0.0036685)	UNIREP	1.0000000	0.4400000	24	0.0100000
0.9074833	(0.5735287, 0.9930493)	0.9074830 (0.0000003)	(0.5735286, 0.9930492) {0.0000001, 0.0000002}	0.9033000 (0.0041833)	UNIREP	1.0000000	0.4500000	24	0.0100000
0.9209642	(0.5973371, 0.9949275)	0.9209637 (0.0000005)	(0.5973369, 0.9949273) {0.0000002, 0.0000002}	0.9186000 (0.0023642)	UNIREP	1.0000000	0.4600000	24	0.0100000

0.9328986	(0.6207855, 0.9963393)	0.9328985 (0.0000001)	(0.6207852, 0.9963391) {0.0000003, 0.0000002}	0.9322000 (0.0006986)	UNIREP	1.0000000	0.4700000	24	0.0100000
0.9433871	(0.6437934, 0.9973876)	0.9433869 (0.0000002)	(0.6437930, 0.9973873) {0.0000004, 0.0000003}	0.9422000 (0.0011871)	UNIREP	1.0000000	0.4800000	24	0.0100000
0.9525367	(0.6662853, 0.9981564)	0.9525364 (0.0000003)	(0.6662847, 0.9981563) {0.0000006, 0.0000001}	0.9519000 (0.0006367)	UNIREP	1.0000000	0.4900000	24	0.0100000
0.9604597	(0.6881903, 0.9987137)	0.9604594 (0.0000004)	(0.6881901, 0.9987135) {0.0000001, 0.0000001}	0.9599000 (0.0005597)	UNIREP	1.0000000	0.5000000	24	0.0100000
0.9672703	(0.7094456, 0.9991126)	0.9672698 (0.0000005)	(0.7094454, 0.9991125) {0.0000002, 0.0000001}	0.9675000 (0.0002297)	UNIREP	1.0000000	0.5100000	24	0.0100000
0.9730812	(0.7299934, 0.9993947)	0.9730810 (0.0000001)	(0.7299931, 0.9993946) {0.0000003, 0.0000001}	0.9729000 (0.0001812)	UNIREP	1.0000000	0.5200000	24	0.0100000
0.9780035	(0.7497837, 0.9995919)	0.9780033 (0.0000002)	(0.7497833, 0.9995917) {0.0000004, 0.0000001}	0.9783000 (0.0002965)	UNIREP	1.0000000	0.5300000	24	0.0100000
0.9821423	(0.7687737, 0.9997279)	0.9821420 (0.0000003)	(0.7687731, 0.9997278) {0.0000005, 0.0000002}	0.9822000 (0.0000577)	UNIREP	1.0000000	0.5400000	24	0.0100000
0.9855968	(0.7869276, 0.9998207)	0.9855965 (0.0000003)	(0.7869275, 0.9998205) {0.0000001, 0.0000002}	0.9849000 (0.0006968)	UNIREP	1.0000000	0.5500000	24	0.0100000
0.9884592	(0.8042190, 0.9998832)	0.9884588 (0.0000004)	(0.8042189, 0.9998830) {0.0000002, 0.0000001}	0.9884000 (0.0000592)	UNIREP	1.0000000	0.5600000	24	0.0100000
0.9908132	(0.8206275, 0.9999248)	0.9908130 (0.0000001)	(0.8206273, 0.9999247) {0.0000002, 0.0000001}	0.9900000 (0.0008132)	UNIREP	1.0000000	0.5700000	24	0.0100000
0.9927355	(0.8361406, 0.9999521)	0.9927353 (0.0000002)	(0.8361403, 0.9999520) {0.0000003, 0.0000001}	0.9920000 (0.0007355)	UNIREP	1.0000000	0.5800000	24	0.0100000
0.9942936	(0.8507529, 0.9999698)	0.9942934 (0.0000002)	(0.8507525, 0.9999698) {0.0000005, 0.0000000}	0.9939000 (0.0003936)	UNIREP	1.0000000	0.5900000	24	0.0100000
0.9955473	(0.8644659, 0.9999812)	0.9955471 (0.0000002)	(0.8644653, 0.9999812) {0.0000006, 0.0000000}	0.9952000 (0.0003473)	UNIREP	1.0000000	0.6000000	24	0.0100000
0.9965488	(0.8772867, 0.9999885)	0.9965485 (0.0000003)	(0.8772866, 0.9999884) {0.0000001, 0.0000001}	0.9962000 (0.0003488)	UNIREP	1.0000000	0.6100000	24	0.0100000
0.9973429	(0.8892303, 0.9999930)	0.9973426 (0.0000003)	(0.8892301, 0.9999930) {0.0000002, 0.0000000}	0.9972000 (0.0001429)	UNIREP	1.0000000	0.6200000	24	0.0100000
0.9979681	(0.9003150, 0.9999958)	0.9979677 (0.0000003)	(0.9003148, 0.9999958) {0.0000003, 0.0000000}	0.9978000 (0.0001681)	UNIREP	1.0000000	0.6300000	24	0.0100000

0.9984563	(0.9105649, 0.9999975)	0.9984562 (0.0000001)	(0.9105645, 0.9999975) {0.0000003, 0.0000000}	0.9989000 (0.0004437)	UNIREP	1.0000000	0.6400000	24	0.0100000
0.9988353	(0.9200078, 0.9999985)	0.9988352 (0.0000001)	(0.9200073, 0.9999985) {0.0000005, 0.0000000}	0.9992000 (0.0003647)	UNIREP	1.0000000	0.6500000	24	0.0100000
0.9991272	(0.9286752, 0.9999992)	0.9991271 (0.0000001)	(0.9286746, 0.9999991) {0.0000006, 0.0000000}	0.9995000 (0.0003728)	UNIREP	1.0000000	0.6600000	24	0.0100000
0.9993504	(0.9366010, 0.9999995)	0.9993503 (0.0000001)	(0.9366009, 0.9999995) {0.0000001, 0.0000000}	0.9995000 (0.0001496)	UNIREP	1.0000000	0.6700000	24	0.0100000
0.9995198	(0.9438229, 0.9999997)	0.9995196 (0.0000001)	(0.9438227, 0.9999991) {0.0000002, 0.0000000}	0.9995000 (0.0000198)	UNIREP	1.0000000	0.6800000	24	0.0100000
0.9996474	(0.9503788, 0.9999998)	0.9996473 (0.0000002)	(0.9503785, 0.9999998) {0.0000002, 0.0000000}	0.9996000 (0.0000474)	UNIREP	1.0000000	0.6900000	24	0.0100000
0.9997429	(0.9563083, 0.9999999)	0.9997428 (0.0000002)	(0.9563079, 0.9999999) {0.0000003, 0.0000000}	0.9997000 (0.0000429)	UNIREP	1.0000000	0.7000000	24	0.0100000
0.9998138	(0.9616515, 1.0000000)	0.9998137 (0.0000002)	(0.9616511, 1.0000000) {0.0000004, 0.0000000}	0.9998000 (0.0000138)	UNIREP	1.0000000	0.7100000	24	0.0100000
0.9998661	(0.9664487, 1.0000000)	0.9998660 (0.0000001)	(0.9664482, 1.0000000) {0.0000005, 0.0000000}	0.9999000 (0.0000339)	UNIREP	1.0000000	0.7200000	24	0.0100000
0.9999044	(0.9707395, 1.0000000)	0.9999042 (0.0000001)	(0.9707394, 1.0000000) {0.0000001, 0.0000000}	0.9999000 (0.0000044)	UNIREP	1.0000000	0.7300000	24	0.0100000
0.9999322	(0.9745640, 1.0000000)	0.9999320 (0.0000001)	(0.9745638, 1.0000000) {0.0000002, 0.0000000}	0.9999000 (0.0000322)	UNIREP	1.0000000	0.7400000	24	0.0100000
0.9999522	(0.9779600, 1.0000000)	0.9999521 (0.0000001)	(0.9779598, 1.0000000) {0.0000002, 0.0000000}	1.0000000 (0.0000478)	UNIREP	1.0000000	0.7500000	24	0.0100000
0.0100000	(0.0100000, 1.0000000)	0.0100000 (0.0000000)	(0.0100000, 1.0000000) {0.0000000, 0.0000000}	0.0104000 (0.0004000)	UNIREP	1.0000000	0.0000000	24	0.0100000
0.0102836	(0.0101589, 1.0000000)	0.0102836 (0.0000000)	(0.0101589, 1.0000000) {0.0000000, 0.0000000}	0.0101000 (0.0001836)	UNIREP	1.0000000	0.0100000	24	0.0100000
0.0111428	(0.0106381, 1.0000000)	0.0111422 (0.0000006)	(0.0106380, 1.0000000) {0.0000001, 0.0000000}	0.0111000 (0.0000428)	UNIREP	1.0000000	0.0200000	24	0.0100000
0.0125988	(0.0114447, 1.0000000)	0.0125988 (0.0000000)	(0.0114447, 1.0000000) {0.0000000, 0.0000000}	0.0125000 (0.0000988)	UNIREP	1.0000000	0.0300000	24	0.0100000
0.0146918	(0.0125909, 1.0000000)	0.0146914 (0.0000004)	(0.0125909, 1.0000000) {0.0000000, 0.0000000}	0.0140000 (0.0006918)	UNIREP	1.0000000	0.0400000	24	0.0100000

0.0174724	(0.0140936, 1.0000000)	0.0174724 (0.0000000)	(0.0140934, 1.0000000) {0.0000003, 0.0000000}	0.0156000 (0.0018724)	UNIREP	1.0000000	0.0500000	24	0.0100000
0.0210076	(0.0159734, 1.0000000)	0.0210074 (0.0000002)	(0.0159734, 1.0000000) {0.0000000, 0.0000000}	0.0182000 (0.0028076)	UNIREP	1.0000000	0.0600000	24	0.0100000
0.0253753	(0.0182565, 1.0000000)	0.0253744 (0.0000010)	(0.0182564, 1.0000000) {0.0000001, 0.0000000}	0.0231000 (0.0022753)	UNIREP	1.0000000	0.0700000	24	0.0100000
0.0306619	(0.0209723, 1.0000000)	0.0306618 (0.0000001)	(0.0209721, 1.0000000) {0.0000002, 0.0000000}	0.0278000 (0.0028619)	UNIREP	1.0000000	0.0800000	24	0.0100000
0.0369672	(0.0241544, 1.0000000)	0.0369668 (0.0000004)	(0.0241537, 1.0000000) {0.0000007, 0.0000000}	0.0349000 (0.0020672)	UNIREP	1.0000000	0.0900000	24	0.0100000
0.0443930	(0.0278380, 1.0000000)	0.0443929 (0.0000000)	(0.0278379, 1.0000000) {0.0000000, 0.0000000}	0.0412000 (0.0031930)	UNIREP	1.0000000	0.1000000	24	0.0100000
0.0530477	(0.0320644, 1.0000000)	0.0530476 (0.0000002)	(0.0320643, 1.0000000) {0.0000001, 0.0000000}	0.0509000 (0.0021477)	UNIREP	1.0000000	0.1100000	24	0.0100000
0.0630393	(0.0368751, 1.0000000)	0.0630388 (0.0000005)	(0.0368747, 1.0000000) {0.0000004, 0.0000000}	0.0600000 (0.0030393)	UNIREP	1.0000000	0.1200000	24	0.0100000
0.0744722	(0.0423140, 1.0000000)	0.0744721 (0.0000001)	(0.0423130, 1.0000000) {0.0000009, 0.0000000}	0.0713000 (0.0031722)	UNIREP	1.0000000	0.1300000	24	0.0100000
0.0874473	(0.0484243, 1.0000000)	0.0874471 (0.0000002)	(0.0484243, 1.0000000) {0.0000001, 0.0000000}	0.0837000 (0.0037473)	UNIREP	1.0000000	0.1400000	24	0.0100000
0.1020538	(0.0552541, 1.0000000)	0.1020532 (0.0000005)	(0.0552539, 1.0000000) {0.0000002, 0.0000000}	0.0982000 (0.0038538)	UNIREP	1.0000000	0.1500000	24	0.0100000
0.1183667	(0.0628476, 1.0000000)	0.1183666 (0.0000001)	(0.0628471, 1.0000000) {0.0000005, 0.0000000}	0.1153000 (0.0030667)	UNIREP	1.0000000	0.1600000	24	0.0100000
0.1364461	(0.0712482, 1.0000000)	0.1364459 (0.0000002)	(0.0712482, 1.0000000) {0.0000000, 0.0000000}	0.1323000 (0.0041461)	UNIREP	1.0000000	0.1700000	24	0.0100000
0.1563294	(0.0804996, 1.0000000)	0.1563289 (0.0000005)	(0.0804995, 1.0000000) {0.0000001, 0.0000000}	0.1520000 (0.0043294)	UNIREP	1.0000000	0.1800000	24	0.0100000
0.1780291	(0.0906407, 1.0000000)	0.1780291 (0.0000001)	(0.0906405, 1.0000000) {0.0000002, 0.0000000}	0.1749000 (0.0031291)	UNIREP	1.0000000	0.1900000	24	0.0100000
0.2015335	(0.1017076, 1.0000000)	0.2015333 (0.0000002)	(0.1017071, 1.0000000) {0.0000005, 0.0000000}	0.1982000 (0.0033335)	UNIREP	1.0000000	0.2000000	24	0.0100000
0.2268000	(0.1137308, 1.0000000)	0.2267995 (0.0000005)	(0.1137307, 1.0000000) {0.0000001, 0.0000000}	0.2282000 (0.0014000)	UNIREP	1.0000000	0.2100000	24	0.0100000

0.2537552	(0.1267373, 1.0000000)	0.2537551 (0.0000001)	(0.1267371, 1.0000000) {0.0000001, 0.0000000}	0.2562000 (0.0024448)	UNIREP	1.0000000	0.2200000	24	0.0100000
0.2822973	(0.1407463, 1.0000000)	0.2822971 (0.0000002)	(0.1407460, 1.0000000) {0.0000003, 0.0000000}	0.2845000 (0.0022027)	UNIREP	1.0000000	0.2300000	24	0.0100000
0.3122924	(0.1557704, 1.0000000)	0.3122919 (0.0000004)	(0.1557698, 1.0000000) {0.0000005, 0.0000000}	0.3145000 (0.0022076)	UNIREP	1.0000000	0.2400000	24	0.0100000
0.3435774	(0.1718135, 1.0000000)	0.3435773 (0.0000001)	(0.1718134, 1.0000000) {0.0000001, 0.0000000}	0.3460000 (0.0024226)	UNIREP	1.0000000	0.2500000	24	0.0100000
0.3759646	(0.1888730, 1.0000000)	0.3759644 (0.0000002)	(0.1888729, 1.0000000) {0.0000001, 0.0000000}	0.3815000 (0.0055354)	UNIREP	1.0000000	0.2600000	24	0.0100000
0.4092416	(0.2069360, 1.0000000)	0.4092412 (0.0000004)	(0.2069357, 1.0000000) {0.0000003, 0.0000000}	0.4150000 (0.0057584)	UNIREP	1.0000000	0.2700000	24	0.0100000
0.4431773	(0.2259803, 1.0000000)	0.4431765 (0.0000007)	(0.2259798, 1.0000000) {0.0000005, 0.0000000}	0.4482000 (0.0050227)	UNIREP	1.0000000	0.2800000	24	0.0100000
0.4775252	(0.2459745, 1.0000000)	0.4775251 (0.0000002)	(0.2459736, 1.0000000) {0.0000009, 0.0000000}	0.4830000 (0.0054748)	UNIREP	1.0000000	0.2900000	24	0.0100000
0.5120327	(0.2668759, 1.0000000)	0.5120324 (0.0000003)	(0.2668758, 1.0000000) {0.0000001, 0.0000000}	0.5151000 (0.0030673)	UNIREP	1.0000000	0.3000000	24	0.0100000
0.5464413	(0.2886356, 1.0000000)	0.5464407 (0.0000006)	(0.2886353, 1.0000000) {0.0000002, 0.0000000}	0.5507000 (0.0042587)	UNIREP	1.0000000	0.3100000	24	0.0100000
0.5804950	(0.3111924, 1.0000000)	0.5804949 (0.0000001)	(0.3111920, 1.0000000) {0.0000004, 0.0000000}	0.5825000 (0.0020050)	UNIREP	1.0000000	0.3200000	24	0.0100000
0.6139478	(0.3344773, 1.0000000)	0.6139475 (0.0000002)	(0.3344765, 1.0000000) {0.0000007, 0.0000000}	0.6145000 (0.0005522)	UNIREP	1.0000000	0.3300000	24	0.0100000
0.6465654	(0.3584114, 1.0000000)	0.6465649 (0.0000004)	(0.3584112, 1.0000000) {0.0000001, 0.0000000}	0.6437000 (0.0028654)	UNIREP	1.0000000	0.3400000	24	0.0100000
0.6781323	(0.3829110, 1.0000000)	0.6781316 (0.0000007)	(0.3829108, 1.0000000) {0.0000002, 0.0000000}	0.6752000 (0.0029323)	UNIREP	1.0000000	0.3500000	24	0.0100000
0.7084547	(0.4078835, 1.0000000)	0.7084545 (0.0000002)	(0.4078832, 1.0000000) {0.0000004, 0.0000000}	0.7044000 (0.0040547)	UNIREP	1.0000000	0.3600000	24	0.0100000
0.7373668	(0.4332312, 1.0000000)	0.7373665 (0.0000003)	(0.4332306, 1.0000000) {0.0000006, 0.0000000}	0.7331000 (0.0042668)	UNIREP	1.0000000	0.3700000	24	0.0100000
0.7647294	(0.4588509, 1.0000000)	0.7647289 (0.0000005)	(0.4588507, 1.0000000) {0.0000001, 0.0000000}	0.7590000 (0.0057294)	UNIREP	1.0000000	0.3800000	24	0.0100000

0.7904330	(0.4846381, 1.0000000)	0.7904328 (0.0000001)	(0.4846379, 1.0000000) {0.0000002, 0.0000000}	0.7851000 (0.0053330)	UNIREP	1.0000000	0.3900000	24	0.0100000
0.8144004	(0.5104847, 1.0000000)	0.8144001 (0.0000002)	(0.5104844, 1.0000000) {0.0000003, 0.0000000}	0.8093000 (0.0051004)	UNIREP	1.0000000	0.4000000	24	0.0100000
0.8365832	(0.5362823, 1.0000000)	0.8365829 (0.0000003)	(0.5362819, 1.0000000) {0.0000005, 0.0000000}	0.8343000 (0.0022832)	UNIREP	1.0000000	0.4100000	24	0.0100000
0.8569626	(0.5619233, 1.0000000)	0.8569621 (0.0000005)	(0.5619226, 1.0000000) {0.0000007, 0.0000000}	0.8553000 (0.0016626)	UNIREP	1.0000000	0.4200000	24	0.0100000
0.8755463	(0.5873010, 1.0000000)	0.8755462 (0.0000001)	(0.5873008, 1.0000000) {0.0000002, 0.0000000}	0.8731000 (0.0024463)	UNIREP	1.0000000	0.4300000	24	0.0100000
0.8923685	(0.6123146, 1.0000000)	0.8923682 (0.0000002)	(0.6123144, 1.0000000) {0.0000002, 0.0000000}	0.8887000 (0.0036685)	UNIREP	1.0000000	0.4400000	24	0.0100000
0.9074833	(0.6368657, 1.0000000)	0.9074830 (0.0000003)	(0.6368653, 1.0000000) {0.0000004, 0.0000000}	0.9033000 (0.0041833)	UNIREP	1.0000000	0.4500000	24	0.0100000
0.9209642	(0.6608622, 1.0000000)	0.9209637 (0.0000005)	(0.6608616, 1.0000000) {0.0000005, 0.0000000}	0.9186000 (0.0023642)	UNIREP	1.0000000	0.4600000	24	0.0100000
0.9328986	(0.6842181, 1.0000000)	0.9328985 (0.0000001)	(0.6842180, 1.0000000) {0.0000001, 0.0000000}	0.9322000 (0.0006986)	UNIREP	1.0000000	0.4700000	24	0.0100000
0.9433871	(0.7068567, 1.0000000)	0.9433869 (0.0000002)	(0.7068565, 1.0000000) {0.0000002, 0.0000000}	0.9422000 (0.0011871)	UNIREP	1.0000000	0.4800000	24	0.0100000
0.9525367	(0.7287082, 1.0000000)	0.9525364 (0.0000003)	(0.7287079, 1.0000000) {0.0000003, 0.0000000}	0.9519000 (0.0006367)	UNIREP	1.0000000	0.4900000	24	0.0100000
0.9604597	(0.7497120, 1.0000000)	0.9604594 (0.0000004)	(0.7497116, 1.0000000) {0.0000004, 0.0000000}	0.9599000 (0.0005597)	UNIREP	1.0000000	0.5000000	24	0.0100000
0.9672703	(0.7698170, 1.0000000)	0.9672698 (0.0000005)	(0.7698164, 1.0000000) {0.0000006, 0.0000000}	0.9675000 (0.0002297)	UNIREP	1.0000000	0.5100000	24	0.0100000
0.9730812	(0.7889809, 1.0000000)	0.9730810 (0.0000001)	(0.7889808, 1.0000000) {0.0000001, 0.0000000}	0.9729000 (0.0001812)	UNIREP	1.0000000	0.5200000	24	0.0100000
0.9780035	(0.8071728, 1.0000000)	0.9780033 (0.0000002)	(0.8071726, 1.0000000) {0.0000002, 0.0000000}	0.9783000 (0.0002965)	UNIREP	1.0000000	0.5300000	24	0.0100000
0.9821423	(0.8243698, 1.0000000)	0.9821420 (0.0000003)	(0.8243695, 1.0000000) {0.0000003, 0.0000000}	0.9822000 (0.0000577)	UNIREP	1.0000000	0.5400000	24	0.0100000
0.9855968	(0.8405588, 1.0000000)	0.9855965 (0.0000003)	(0.8405584, 1.0000000) {0.0000004, 0.0000000}	0.9849000 (0.0006968)	UNIREP	1.0000000	0.5500000	24	0.0100000

0.9884592	(0.8557356, 1.0000000)	0.9884588 (0.0000004)	(0.8557351, 1.0000000) {0.0000005, 0.0000000}	0.9884000 (0.0000592)	UNIREP	1.0000000	0.5600000	24	0.0100000
0.9908132	(0.8699040, 1.0000000)	0.9908130 (0.0000001)	(0.8699038, 1.0000000) {0.0000001, 0.0000000}	0.9900000 (0.0008132)	UNIREP	1.0000000	0.5700000	24	0.0100000
0.9927355	(0.8830768, 1.0000000)	0.9927353 (0.0000002)	(0.8830767, 1.0000000) {0.0000002, 0.0000000}	0.9920000 (0.0007355)	UNIREP	1.0000000	0.5800000	24	0.0100000
0.9942936	(0.8952731, 1.0000000)	0.9942934 (0.0000002)	(0.8952728, 1.0000000) {0.0000002, 0.0000000}	0.9939000 (0.0003936)	UNIREP	1.0000000	0.5900000	24	0.0100000
0.9955473	(0.9065183, 1.0000000)	0.9955471 (0.0000002)	(0.9065180, 1.0000000) {0.0000003, 0.0000000}	0.9952000 (0.0003473)	UNIREP	1.0000000	0.6000000	24	0.0100000
0.9965488	(0.9168438, 1.0000000)	0.9965485 (0.0000003)	(0.9168434, 1.0000000) {0.0000004, 0.0000000}	0.9962000 (0.0003488)	UNIREP	1.0000000	0.6100000	24	0.0100000
0.9973429	(0.9262856, 1.0000000)	0.9973426 (0.0000003)	(0.9262851, 1.0000000) {0.0000005, 0.0000000}	0.9972000 (0.0001429)	UNIREP	1.0000000	0.6200000	24	0.0100000
0.9979681	(0.9348830, 1.0000000)	0.9979677 (0.0000003)	(0.9348829, 1.0000000) {0.0000001, 0.0000000}	0.9978000 (0.0001681)	UNIREP	1.0000000	0.6300000	24	0.0100000
0.9984563	(0.9426801, 1.0000000)	0.9984562 (0.0000001)	(0.9426799, 1.0000000) {0.0000002, 0.0000000}	0.9989000 (0.0004437)	UNIREP	1.0000000	0.6400000	24	0.0100000
0.9988353	(0.9497218, 1.0000000)	0.9988352 (0.0000001)	(0.9497215, 1.0000000) {0.0000002, 0.0000000}	0.9992000 (0.0003647)	UNIREP	1.0000000	0.6500000	24	0.0100000
0.9991272	(0.9560550, 1.0000000)	0.9991271 (0.0000001)	(0.9560547, 1.0000000) {0.0000003, 0.0000000}	0.9995000 (0.0003728)	UNIREP	1.0000000	0.6600000	24	0.0100000
0.9993504	(0.9617276, 1.0000000)	0.9993503 (0.0000001)	(0.9617272, 1.0000000) {0.0000004, 0.0000000}	0.9995000 (0.0001496)	UNIREP	1.0000000	0.6700000	24	0.0100000
0.9995198	(0.9667875, 1.0000000)	0.9995196 (0.0000001)	(0.9667870, 1.0000000) {0.0000005, 0.0000000}	0.9995000 (0.0000198)	UNIREP	1.0000000	0.6800000	24	0.0100000
0.9996474	(0.9712818, 1.0000000)	0.9996473 (0.0000002)	(0.9712816, 1.0000000) {0.0000001, 0.0000000}	0.9996000 (0.0000474)	UNIREP	1.0000000	0.6900000	24	0.0100000
0.9997429	(0.9752580, 1.0000000)	0.9997428 (0.0000002)	(0.9752579, 1.0000000) {0.0000002, 0.0000000}	0.9997000 (0.0000429)	UNIREP	1.0000000	0.7000000	24	0.0100000
0.9998138	(0.9787611, 1.0000000)	0.9998137 (0.0000002)	(0.9787609, 1.0000000) {0.0000002, 0.0000000}	0.9998000 (0.0000138)	UNIREP	1.0000000	0.7100000	24	0.0100000
0.9998661	(0.9818347, 1.0000000)	0.9998660 (0.0000001)	(0.9818345, 1.0000000) {0.0000002, 0.0000000}	0.9999000 (0.0000339)	UNIREP	1.0000000	0.7200000	24	0.0100000

0.9999044	(0.9845204, 1.0000000)	0.9999042 (0.0000001)	(0.9845201, 1.0000000) {0.0000003, 0.0000000}	0.9999000 (0.0000044)	UNIREP	1.0000000	0.7300000	24	0.0100000
0.9999322	(0.9868574, 1.0000000)	0.9999320 (0.0000001)	(0.9868571, 1.0000000) {0.0000004, 0.0000000}	0.9999000 (0.0000322)	UNIREP	1.0000000	0.7400000	24	0.0100000
0.9999522	(0.9888827, 1.0000000)	0.9999521 (0.0000001)	(0.9888823, 1.0000000) {0.0000004, 0.0000000}	1.0000000 (0.0000478)	UNIREP	1.0000000	0.7500000	24	0.0100000
0.0100000	(0.0100000, 0.0100000)	0.0100000 (0.0000000)	(0.0100000, 0.0100000) {0.0000000, 0.0000000}	0.0104000 (0.0004000)	UNIREP	1.0000000	0.0000000	24	0.0100000
0.0102836	(0.0100000, 0.0104379)	0.0102836 (0.0000000)	(0.0100000, 0.0104379) {0.0000000, 0.0000000}	0.0101000 (0.0001836)	UNIREP	1.0000000	0.0100000	24	0.0100000
0.0111428	(0.0100000, 0.0117699)	0.0111422 (0.0000006)	(0.0100000, 0.0117699) {0.0000000, 0.0000000}	0.0111000 (0.0000428)	UNIREP	1.0000000	0.0200000	24	0.0100000
0.0125988	(0.0100000, 0.0140508)	0.0125988 (0.0000000)	(0.0100000, 0.0140506) {0.0000000, 0.0000002}	0.0125000 (0.0000988)	UNIREP	1.0000000	0.0300000	24	0.0100000
0.0146918	(0.0100000, 0.0173694)	0.0146914 (0.0000004)	(0.0100000, 0.0173693) {0.0000000, 0.0000000}	0.0140000 (0.0006918)	UNIREP	1.0000000	0.0400000	24	0.0100000
0.0174724	(0.0100000, 0.0218484)	0.0174724 (0.0000000)	(0.0100000, 0.0218481) {0.0000000, 0.0000003}	0.0156000 (0.0018724)	UNIREP	1.0000000	0.0500000	24	0.0100000
0.0210076	(0.0100000, 0.0276378)	0.0210074 (0.0000002)	(0.0100000, 0.0276378) {0.0000000, 0.0000000}	0.0182000 (0.0028076)	UNIREP	1.0000000	0.0600000	24	0.0100000
0.0253753	(0.0100000, 0.0349136)	0.0253744 (0.0000010)	(0.0100000, 0.0349133) {0.0000000, 0.0000003}	0.0231000 (0.0022753)	UNIREP	1.0000000	0.0700000	24	0.0100000
0.0306619	(0.0100000, 0.0438681)	0.0306618 (0.0000001)	(0.0100000, 0.0438681) {0.0000000, 0.0000000}	0.0278000 (0.0028619)	UNIREP	1.0000000	0.0800000	24	0.0100000
0.0369672	(0.0100000, 0.0547065)	0.0369668 (0.0000004)	(0.0100000, 0.0547063) {0.0000000, 0.0000002}	0.0349000 (0.0020672)	UNIREP	1.0000000	0.0900000	24	0.0100000
0.0443930	(0.0100000, 0.0676352)	0.0443929 (0.0000000)	(0.0100000, 0.0676345) {0.0000000, 0.0000007}	0.0412000 (0.0031930)	UNIREP	1.0000000	0.1000000	24	0.0100000
0.0530477	(0.0100000, 0.0828515)	0.0530476 (0.0000002)	(0.0100000, 0.0828514) {0.0000000, 0.0000001}	0.0509000 (0.0021477)	UNIREP	1.0000000	0.1100000	24	0.0100000
0.0630393	(0.0100000, 0.1005384)	0.0630388 (0.0000005)	(0.0100000, 0.1005379) {0.0000000, 0.0000005}	0.0600000 (0.0030393)	UNIREP	1.0000000	0.1200000	24	0.0100000
0.0744722	(0.0100000, 0.1208454)	0.0744721 (0.0000001)	(0.0100000, 0.1208453) {0.0000000, 0.0000001}	0.0713000 (0.0031722)	UNIREP	1.0000000	0.1300000	24	0.0100000

0.0874473	(0.0100000, 0.1438850)	0.0874471 (0.0000002)	(0.0100000, 0.1438847) {0.0000000, 0.0000003}	0.0837000 (0.0037473)	UNIREP	1.0000000	0.1400000	24	0.0100000
0.1020538	(0.0100000, 0.1697172)	0.1020532 (0.0000005)	(0.0100000, 0.1697163) {0.0000000, 0.0000009}	0.0982000 (0.0038538)	UNIREP	1.0000000	0.1500000	24	0.0100000
0.1183667	(0.0100000, 0.1983408)	0.1183666 (0.0000001)	(0.0100000, 0.1983406) {0.0000000, 0.0000002}	0.1153000 (0.0030667)	UNIREP	1.0000000	0.1600000	24	0.0100000
0.1364461	(0.0100000, 0.2296913)	0.1364459 (0.0000002)	(0.0100000, 0.2296908) {0.0000000, 0.0000005}	0.1323000 (0.0041461)	UNIREP	1.0000000	0.1700000	24	0.0100000
0.1563294	(0.0100000, 0.2636290)	0.1563289 (0.0000005)	(0.0100000, 0.2636288) {0.0000000, 0.0000001}	0.1520000 (0.0043294)	UNIREP	1.0000000	0.1800000	24	0.0100000
0.1780291	(0.0100000, 0.2999441)	0.1780291 (0.0000001)	(0.0100000, 0.2999437) {0.0000000, 0.0000003}	0.1749000 (0.0031291)	UNIREP	1.0000000	0.1900000	24	0.0100000
0.2015335	(0.0100000, 0.3383544)	0.2015333 (0.0000002)	(0.0100000, 0.3383536) {0.0000000, 0.0000008}	0.1982000 (0.0033335)	UNIREP	1.0000000	0.2000000	24	0.0100000
0.2268000	(0.0100000, 0.3785113)	0.2267995 (0.0000005)	(0.0100000, 0.3785111) {0.0000000, 0.0000002}	0.2282000 (0.0014000)	UNIREP	1.0000000	0.2100000	24	0.0100000
0.2537552	(0.0100000, 0.4200131)	0.2537551 (0.0000001)	(0.0100000, 0.4200126) {0.0000000, 0.0000005}	0.2562000 (0.0024448)	UNIREP	1.0000000	0.2200000	24	0.0100000
0.2822973	(0.0100000, 0.4624101)	0.2822971 (0.0000002)	(0.0100000, 0.4624100) {0.0000000, 0.0000001}	0.2845000 (0.0022027)	UNIREP	1.0000000	0.2300000	24	0.0100000
0.3122924	(0.0100000, 0.5052255)	0.3122919 (0.0000004)	(0.0100000, 0.5052252) {0.0000000, 0.0000003}	0.3145000 (0.0022076)	UNIREP	1.0000000	0.2400000	24	0.0100000
0.3435774	(0.0100000, 0.5479669)	0.3435773 (0.0000001)	(0.0100000, 0.5479664) {0.0000000, 0.0000006}	0.3460000 (0.0024226)	UNIREP	1.0000000	0.2500000	24	0.0100000
0.3759646	(0.0100000, 0.5901447)	0.3759644 (0.0000002)	(0.0100000, 0.5901445) {0.0000000, 0.0000002}	0.3815000 (0.0055354)	UNIREP	1.0000000	0.2600000	24	0.0100000
0.4092416	(0.0100000, 0.6312909)	0.4092412 (0.0000004)	(0.0100000, 0.6312905) {0.0000000, 0.0000003}	0.4150000 (0.0057584)	UNIREP	1.0000000	0.2700000	24	0.0100000
0.4431773	(0.0100000, 0.6709712)	0.4431765 (0.0000007)	(0.0100000, 0.6709706) {0.0000000, 0.0000006}	0.4482000 (0.0050227)	UNIREP	1.0000000	0.2800000	24	0.0100000
0.4775252	(0.0100000, 0.7087998)	0.4775251 (0.0000002)	(0.0100000, 0.7087996) {0.0000000, 0.0000002}	0.4830000 (0.0054748)	UNIREP	1.0000000	0.2900000	24	0.0100000
0.5120327	(0.0100000, 0.7444527)	0.5120324 (0.0000003)	(0.0100000, 0.7444523) {0.0000000, 0.0000004}	0.5151000 (0.0030673)	UNIREP	1.0000000	0.3000000	24	0.0100000

0.5464413	(0.0100000, 0.7776712)	0.5464407 (0.0000006)	(0.0100000, 0.7776706) {0.0000000, 0.0000006}	0.5507000 (0.0042587)	UNIREP	1.0000000	0.3100000	24	0.0100000
0.5804950	(0.0100000, 0.8082682)	0.5804949 (0.0000001)	(0.0100000, 0.8082680) {0.0000000, 0.0000002}	0.5825000 (0.0020050)	UNIREP	1.0000000	0.3200000	24	0.0100000
0.6139478	(0.0100000, 0.8361310)	0.6139475 (0.0000002)	(0.0100000, 0.8361307) {0.0000000, 0.0000003}	0.6145000 (0.0005522)	UNIREP	1.0000000	0.3300000	24	0.0100000
0.6465654	(0.0100000, 0.8612149)	0.6465649 (0.0000004)	(0.0100000, 0.8612144) {0.0000000, 0.0000006}	0.6437000 (0.0028654)	UNIREP	1.0000000	0.3400000	24	0.0100000
0.6781323	(0.0100000, 0.8835399)	0.6781316 (0.0000007)	(0.0100000, 0.8835397) {0.0000000, 0.0000002}	0.6752000 (0.0029323)	UNIREP	1.0000000	0.3500000	24	0.0100000
0.7084547	(0.0100000, 0.9031849)	0.7084545 (0.0000002)	(0.0100000, 0.9031846) {0.0000000, 0.0000003}	0.7044000 (0.0040547)	UNIREP	1.0000000	0.3600000	24	0.0100000
0.7373668	(0.0100000, 0.9202752)	0.7373665 (0.0000003)	(0.0100000, 0.9202747) {0.0000000, 0.0000005}	0.7331000 (0.0042668)	UNIREP	1.0000000	0.3700000	24	0.0100000
0.7647294	(0.0100000, 0.9349741)	0.7647289 (0.0000005)	(0.0100000, 0.9349740) {0.0000000, 0.0000001}	0.7590000 (0.0057294)	UNIREP	1.0000000	0.3800000	24	0.0100000
0.7904330	(0.0100000, 0.9474740)	0.7904328 (0.0000001)	(0.0100000, 0.9474737) {0.0000000, 0.0000002}	0.7851000 (0.0053330)	UNIREP	1.0000000	0.3900000	24	0.0100000
0.8144004	(0.0100000, 0.9579832)	0.8144001 (0.0000002)	(0.0100000, 0.9579829) {0.0000000, 0.0000003}	0.8093000 (0.0051004)	UNIREP	1.0000000	0.4000000	24	0.0100000
0.8365832	(0.0100000, 0.9667192)	0.8365829 (0.0000003)	(0.0100000, 0.9667187) {0.0000000, 0.0000005}	0.8343000 (0.0022832)	UNIREP	1.0000000	0.4100000	24	0.0100000
0.8569626	(0.0100000, 0.9738986)	0.8569621 (0.0000005)	(0.0100000, 0.9738984) {0.0000000, 0.0000002}	0.8553000 (0.0016626)	UNIREP	1.0000000	0.4200000	24	0.0100000
0.8755463	(0.0100000, 0.9797329)	0.8755462 (0.0000001)	(0.0100000, 0.9797327) {0.0000000, 0.0000002}	0.8731000 (0.0024463)	UNIREP	1.0000000	0.4300000	24	0.0100000
0.8923685	(0.0100000, 0.9844206)	0.8923682 (0.0000002)	(0.0100000, 0.9844203) {0.0000000, 0.0000003}	0.8887000 (0.0036685)	UNIREP	1.0000000	0.4400000	24	0.0100000
0.9074833	(0.0100000, 0.9881445)	0.9074830 (0.0000003)	(0.0100000, 0.9881441) {0.0000000, 0.0000004}	0.9033000 (0.0041833)	UNIREP	1.0000000	0.4500000	24	0.0100000
0.9209642	(0.0100000, 0.9910692)	0.9209637 (0.0000005)	(0.0100000, 0.9910691) {0.0000000, 0.0000001}	0.9186000 (0.0023642)	UNIREP	1.0000000	0.4600000	24	0.0100000
0.9328986	(0.0100000, 0.9933410)	0.9328985 (0.0000001)	(0.0100000, 0.9933408) {0.0000000, 0.0000002}	0.9322000 (0.0006986)	UNIREP	1.0000000	0.4700000	24	0.0100000

0.9433871	(0.0100000, 0.9950856)	0.9433869 (0.0000002)	(0.0100000, 0.9950854) {0.0000000, 0.0000002}	0.9422000 (0.0011871)	UNIREP	1.0000000	0.4800000	24	0.0100000
0.9525367	(0.0100000, 0.9964103)	0.9525364 (0.0000003)	(0.0100000, 0.9964100) {0.0000000, 0.0000003}	0.9519000 (0.0006367)	UNIREP	1.0000000	0.4900000	24	0.0100000
0.9604597	(0.0100000, 0.9974049)	0.9604594 (0.0000004)	(0.0100000, 0.9974046) {0.0000000, 0.0000003}	0.9599000 (0.0005597)	UNIREP	1.0000000	0.5000000	24	0.0100000
0.9672703	(0.0100000, 0.9981434)	0.9672698 (0.0000005)	(0.0100000, 0.9981430) {0.0000000, 0.0000003}	0.9675000 (0.0002297)	UNIREP	1.0000000	0.5100000	24	0.0100000
0.9730812	(0.0100000, 0.9986852)	0.9730810 (0.0000001)	(0.0100000, 0.9986851) {0.0000000, 0.0000001}	0.9729000 (0.0001812)	UNIREP	1.0000000	0.5200000	24	0.0100000
0.9780035	(0.0100000, 0.9990787)	0.9780033 (0.0000002)	(0.0100000, 0.9990786) {0.0000000, 0.0000001}	0.9783000 (0.0002965)	UNIREP	1.0000000	0.5300000	24	0.0100000
0.9821423	(0.0100000, 0.9993612)	0.9821420 (0.0000003)	(0.0100000, 0.9993611) {0.0000000, 0.0000001}	0.9822000 (0.0000577)	UNIREP	1.0000000	0.5400000	24	0.0100000
0.9855968	(0.0100000, 0.9995617)	0.9855965 (0.0000003)	(0.0100000, 0.9995616) {0.0000000, 0.0000001}	0.9849000 (0.0006968)	UNIREP	1.0000000	0.5500000	24	0.0100000
0.9884592	(0.0100000, 0.9997024)	0.9884588 (0.0000004)	(0.0100000, 0.9997023) {0.0000000, 0.0000002}	0.9884000 (0.0000592)	UNIREP	1.0000000	0.5600000	24	0.0100000
0.9908132	(0.0100000, 0.9998001)	0.9908130 (0.0000001)	(0.0100000, 0.9998000) {0.0000000, 0.0000002}	0.9900000 (0.0008132)	UNIREP	1.0000000	0.5700000	24	0.0100000
0.9927355	(0.0100000, 0.9998671)	0.9927353 (0.0000002)	(0.0100000, 0.9998670) {0.0000000, 0.0000001}	0.9920000 (0.0007355)	UNIREP	1.0000000	0.5800000	24	0.0100000
0.9942936	(0.0100000, 0.9999126)	0.9942934 (0.0000002)	(0.0100000, 0.9999125) {0.0000000, 0.0000001}	0.9939000 (0.0003936)	UNIREP	1.0000000	0.5900000	24	0.0100000
0.9955473	(0.0100000, 0.9999432)	0.9955471 (0.0000002)	(0.0100000, 0.9999430) {0.0000000, 0.0000001}	0.9952000 (0.0003473)	UNIREP	1.0000000	0.6000000	24	0.0100000
0.9965488	(0.0100000, 0.9999634)	0.9965485 (0.0000003)	(0.0100000, 0.9999633) {0.0000000, 0.0000000}	0.9962000 (0.0003488)	UNIREP	1.0000000	0.6100000	24	0.0100000
0.9973429	(0.0100000, 0.9999767)	0.9973426 (0.0000003)	(0.0100000, 0.9999766) {0.0000000, 0.0000000}	0.9972000 (0.0001429)	UNIREP	1.0000000	0.6200000	24	0.0100000
0.9979681	(0.0100000, 0.9999853)	0.9979677 (0.0000003)	(0.0100000, 0.9999853) {0.0000000, 0.0000000}	0.9978000 (0.0001681)	UNIREP	1.0000000	0.6300000	24	0.0100000
0.9984563	(0.0100000, 0.9999908)	0.9984562 (0.0000001)	(0.0100000, 0.9999908) {0.0000000, 0.0000000}	0.9989000 (0.0004437)	UNIREP	1.0000000	0.6400000	24	0.0100000

0.9988353	(0.0100000, 0.9999943)	0.9988352 (0.0000001)	(0.0100000, 0.9999943) {0.0000000, 0.0000000}	0.9992000 (0.0003647)	UNIREP	1.0000000	0.6500000	24	0.0100000
0.9991272	(0.0100000, 0.9999966)	0.9991271 (0.0000001)	(0.0100000, 0.9999965) {0.0000000, 0.0000000}	0.9995000 (0.0003728)	UNIREP	1.0000000	0.6600000	24	0.0100000
0.9993504	(0.0100000, 0.9999979)	0.9993503 (0.0000001)	(0.0100000, 0.9999979) {0.0000000, 0.0000000}	0.9995000 (0.0001496)	UNIREP	1.0000000	0.6700000	24	0.0100000
0.9995198	(0.0100000, 0.9999988)	0.9995196 (0.0000001)	(0.0100000, 0.9999987) {0.0000000, 0.0000000}	0.9995000 (0.0000198)	UNIREP	1.0000000	0.6800000	24	0.0100000
0.9996474	(0.0100000, 0.9999993)	0.9996473 (0.0000002)	(0.0100000, 0.9999993) {0.0000000, 0.0000000}	0.9996000 (0.0000474)	UNIREP	1.0000000	0.6900000	24	0.0100000
0.9997429	(0.0100000, 0.9999996)	0.9997428 (0.0000002)	(0.0100000, 0.9999996) {0.0000000, 0.0000000}	0.9997000 (0.0000429)	UNIREP	1.0000000	0.7000000	24	0.0100000
0.9998138	(0.0100000, 0.9999998)	0.9998137 (0.0000002)	(0.0100000, 0.9999997) {0.0000000, 0.0000000}	0.9998000 (0.0000138)	UNIREP	1.0000000	0.7100000	24	0.0100000
0.9998661	(0.0100000, 0.9999999)	0.9998660 (0.0000001)	(0.0100000, 0.9999999) {0.0000000, 0.0000000}	0.9999000 (0.0000339)	UNIREP	1.0000000	0.7200000	24	0.0100000
0.9999044	(0.0100000, 0.9999999)	0.9999042 (0.0000001)	(0.0100000, 0.9999999) {0.0000000, 0.0000000}	0.9999000 (0.0000044)	UNIREP	1.0000000	0.7300000	24	0.0100000
0.9999322	(0.0100000, 1.0000000)	0.9999320 (0.0000001)	(0.0100000, 1.0000000) {0.0000000, 0.0000000}	0.9999000 (0.0000322)	UNIREP	1.0000000	0.7400000	24	0.0100000
0.9999522	(0.0100000, 1.0000000)	0.9999521 (0.0000001)	(0.0100000, 1.0000000) {0.0000000, 0.0000000}	1.0000000 (0.0000478)	UNIREP	1.0000000	0.7500000	24	0.0100000

References

Glueck, D. H., & Muller, K. E. (2003). Adjusting power for a baseline covariate in linear models. *Statistics in Medicine*, 22(16), 2535-2551.

Johnson, J. L., Muller, K. E., Slaughter, J. C., Gurka, M. J., & Gribbin, M. J. (2009). POWERLIB: SAS/IML Software for Computing Power in Multivariate Linear Models. *Journal of Statistical Software*, 30(5), 1-27.

Muller, K. E., & Stewart, P. W. (2006). *Linear model theory: univariate, multivariate, and mixed models*. Hoboken, New Jersey: John Wiley and Sons.