Extended tables to the median paper

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1 Extended Tables

In this document, you find extended tables to Ruckdeschel (2004)

n **odd**

n	exact	error of 1st order asymptotics		error of 2nd order asymptotics	
	$\mathrm{Var}_n^{\mathrm{id}}$	abs. error	rel. error	abs. error	rel. error
3	1.3460	$2.2478\,\mathrm{E}-01$	16.6999 %	$5.2495\,\mathrm{E}-05$	0.0039 %
5	1.4342	$1.3663\,\mathrm{E}-01$	9.5266 %	$1.7897\,\mathrm{E}-03$	0.1248 %
11	1.5088	$6.2010\,\mathrm{E}-02$	4.1098 %	$7.1942\,\mathrm{E}-04$	0.0477 %
31	1.5489	$2.1863\,\mathrm{E}-02$	1.4115 %	$1.1527\,\mathrm{E}-04$	0.0074 %
51	1.5575	$1.3264\,\mathrm{E}-02$	0.8516 %	$4.4547\,\mathrm{E}-05$	0.0029 %
101	1.5641	$6.6869\,\mathrm{E}-03$	0.4275 %	$1.1739\,\mathrm{E}-05$	0.0008 %
1001	1.5701	$6.7364\,\mathrm{E}-04$	0.0429 %	$1.2304\,\mathrm{E}-07$	0.0000 %
10001	1.5707	$6.7414\,\mathrm{E}-05$	0.0042 %	$1.2365\,\mathrm{E}-09$	0.0000 %
∞	1.5708	$0.0000\,\mathrm{E}+00$	0.0000 %	$0.0000\,\mathrm{E}+00$	0.0000 %

Table 1(a): Exactitude of the asymptotics in the ideal model

References

Ruckdeschel P. (2004): Higher Order Asymptotics for the MSE of the Median on Shrinking Neighborhoods. unpublished manuscript. Also available in

n **even**, $X_{[n/2:n]}$, $X_{[(n/2+1):n]}$, M'_n

n	exact	error of 1st order asymptotics		error of 2nd order asymptotics	
	$\mathrm{Var}_n^{\mathrm{id}}$	abs. error	rel. error	abs. error	rel. error
6	1.7210	$-1.5021\,\mathrm{E}-02$	$-8.7278\,\%$	$-7.7151\,\mathrm{E}-04$	$-0.4483\,\%$
10	1.6610	$-9.0216\,\mathrm{E}-02$	$-5.4314\,\%$	$-5.5600\,\mathrm{E}-04$	$-0.3347\,\%$
30	1.6008	$-2.9981\,\mathrm{E}-02$	$-1.8729\,\%$	$-9.3768\,\mathrm{E}-05$	$-0.0586\,\%$
50	1.5888	$-1.7968\,\mathrm{E}-02$	$-1.1310\,\%$	$-3.6059\,\mathrm{E}-05$	$-0.0227\,\%$
100	1.5798	$-8.9755\,\mathrm{E}-03$	$-0.5682\,\%$	$-9.4447\,\mathrm{E}-06$	$-0.0060\,\%$
1000	1.5717	$-8.9670\,\mathrm{E}-04$	$-0.0571\,\%$	$-9.8298\,\mathrm{E}-08$	$-0.0001\,\%$
10000	1.5709	$-8.9661\,\mathrm{E}-05$	$-0.0057\,\%$	$-9.7760\,\mathrm{E}-10$	$-0.0000\,\%$
∞	1.5708	$0.0000\,\mathrm{E}+00$	$0.0000\,\%$	$0.0000\,\mathrm{E}+00$	$0.0000\,\%$

n **even**, M''_n

n	exact	error of 1st order as.		error of 2nd order as.	
	$\mathrm{Var}_n^{\mathrm{id}}$	abs. error	rel. error	abs. error	rel. error
6	1.4776	$9.3198\,\mathrm{E}-02$	$6.3074\,\%$	$-1.9167\,\mathrm{E}-02$	$-0.4483\,\%$
10	1.5106	$6.0186\,\mathrm{E}-02$	$3.9842\,\%$	$-7.2328\,\mathrm{E}-03$	$-0.3347\,\%$
30	1.5492	$2.1632\,\mathrm{E}-02$	$1.3964\,\%$	$-8.4072\,\mathrm{E}-04$	$-0.0586\,\%$
50	1.5576	$1.3179\,\mathrm{E}-02$	$0.8461\,\%$	$-3.0528\,\mathrm{E}-04$	$-0.0227\,\%$
100	1.5641	$6.6651\,\mathrm{E}-03$	$0.4261\,\%$	$-7.6808\,\mathrm{E}-05$	$-0.0060\,\%$
1000	1.5701	$6.7342\,\mathrm{E}-04$	$0.0429\,\%$	$-7.7243\,\mathrm{E}-07$	$-0.0001\,\%$
10000	1.5707	$6.7411\,\mathrm{E}-05$	$0.0043\,\%$	$-7.7195\,\mathrm{E}-09$	$-0.0000\,\%$
∞	1.5708	$0.0000\,\mathrm{E}+00$	$0.0000\,\%$	$0.0000\,\mathrm{E}+00$	$0.0000\,\%$

n **even**, $\bar{M}_n$

n	exact	error of 1st order asymptotics		error of 2nd order asymptotics	
	$\mathrm{Var}_n^{\mathrm{id}}$	abs. error	rel. error	abs. error	rel. error
6	1.2885	$2.8234\,\mathrm{E}-01$	$21.9131\,\%$	$-9.1824\,\mathrm{E}-02$	$-7.1267\,\%$
10	1.3833	$1.8753\,\mathrm{E}-01$	$13.5572\,\%$	$-3.6967\,\mathrm{E}-02$	$-2.6724\,\%$
30	1.5007	$7.0134\,\mathrm{E}-02$	$4.6735\,\%$	$-4.6993\,\mathrm{E}-03$	$-0.3131\,\%$
50	1.5276	$4.3155\,\mathrm{E}-02$	$2.8249\,\%$	$-1.7452\,\mathrm{E}-03$	$-0.1142\,\%$
100	1.5488	$2.2003\,\mathrm{E}-02$	$1.4206\,\%$	$-4.4716\,\mathrm{E}-04$	$-0.0289\,\%$
1000	1.5686	$2.2404\,\mathrm{E}-03$	$0.1421\,\%$	$-4.5766\,\mathrm{E}-06$	$-0.0003\,\%$
10000	1.5706	$2.2445\,\mathrm{E}-04$	$0.0143\,\%$	$-4.5864\,\mathrm{E}-08$	$-0.0000\,\%$
∞	1.5708	$0.0000\,\mathrm{E}+00$	$0.0000\,\%$	$0.0000\,\mathrm{E}+00$	$0.0000\,\%$

Table 1(b): Exactitude of the asymptotics in the ideal model

$n = 5$

r	sim	[low; up]	num	n^0	$n^{-1/2}$	n^{-1}
0.00	1.423	[1.384 ;1.464]	1.434	1.571	1.571	1.436
0.10	1.652	[1.602 ;1.701]	1.671	1.587	1.728	1.613
0.25	2.182	[2.112 ;2.253]	2.157	1.669	2.042	2.032
0.50	3.014	[2.917 ;3.111]	3.045	1.963	2.842	3.258
1.00	4.525	[4.394 ;4.655]	4.509	3.142	5.952	8.853

$n = 10$

r	sim	[low; up]	num	n^0	$n^{-1/2}$	n^{-1}
0.00	1.371	[1.333 ;1.410]	1.383	1.571	1.571	1.346
0.10	1.534	[1.491 ;1.578]	1.521	1.587	1.687	1.472
0.25	1.834	[1.777 ;1.891]	1.879	1.669	1.933	1.771
0.50	2.980	[2.882 ;3.078]	2.916	1.963	2.584	2.636
1.00	5.723	[5.568 ;5.879]	5.735	3.142	5.129	6.422

$n = 30$

r	sim	[low; up]	num	n^0	$n^{-1/2}$	n^{-1}
0.00	1.518	[1.476 ;1.560]	1.501	1.571	1.571	1.496
0.10	1.614	[1.569 ;1.659]	1.579	1.587	1.644	1.573
0.25	1.786	[1.736 ;1.835]	1.779	1.669	1.821	1.767
0.50	2.400	[2.331 ;2.469]	2.390	1.963	2.322	2.339
1.00	5.391	[5.245 ;5.538]	5.255	3.142	4.289	4.720

$n = 50$

r	sim	[low; up]	num	n^0	$n^{-1/2}$	n^{-1}
0.00	1.511	[1.469 ;1.554]	1.528	1.571	1.571	1.526
0.10	1.575	[1.530 ;1.620]	1.591	1.587	1.631	1.588
0.25	1.756	[1.707 ;1.805]	1.759	1.669	1.787	1.755
0.50	2.178	[2.118 ;2.238]	2.271	1.963	2.241	2.251
1.00	4.470	[4.358 ;4.581]	4.473	3.142	4.030	4.289

$n = 100$

r	sim	[low; up]	num	n^0	$n^{-1/2}$	n^{-1}
0.00	1.546	[1.503 ;1.589]	1.549	1.571	1.571	1.548
0.10	1.585	[1.541 ;1.629]	1.597	1.587	1.618	1.597
0.25	1.707	[1.660 ;1.754]	1.737	1.669	1.752	1.736
0.50	2.165	[2.106 ;2.223]	2.171	1.963	2.160	2.165
1.00	4.010	[3.911 ;4.108]	3.952	3.142	3.770	3.899

Table 2: Asymptotics compared to numerical and simulational evaluations