Extended tables and graphs of the following paper.

Tse, Y.K. and X. Zhang (2002), "The Variance Ratio Test with Stable Paretian Errors", *Journal of Time Series Analysis*, 23, 117-126.

To facilitate the use of the normalized OVR statistic as a test for the random walk hypothesis under stable Paretian errors we estimated the quantiles of the statistic in finite samples. We considered T = 120, 240, 600, 1200 and 2400, with q = 2 (1) 6 and α = 1.9 (-0.1) 1.0. Based on Monte Carlo runs of 100000 samples we estimated the quantiles at 2.5%, 5.0%, 95% and 97.5%. The results are summarized in Tables 1 through 5. These tables provide estimates of the critical values for testing the random walk hypothesis in finite samples.

Table 1. Finite-Sample Quantiles of the OVR Statistic: $T = 120$

α	%	$q = 2$	$q = 3$	$q = 4$	$q = 5$	$q = 6$
1.90	2.5	-1.053	-1.531	-1.886	-2.174	-2.430
	5.0	-0.894	-1.323	-1.650	-1.923	-2.165
	95.0	0.706	1.038	1.249	1.432	1.558
	97.5	0.862	1.283	1.585	1.850	2.026
1.80	2.5	-1.151	-1.677	-2.093	-2.410	-2.678
	5.0	-0.966	-1.439	-1.820	-2.125	-2.375
	95.0	0.754	1.098	1.336	1.528	1.666
	97.5	0.927	1.373	1.699	1.966	2.167
1.70	2.5	-1.284	-1.874	-2.332	-2.694	-2.996
	5.0	-1.060	-1.591	-2.008	-2.354	-2.649
	95.0	0.816	1.184	1.454	1.654	1.805
	97.5	1.021	1.489	1.864	2.154	2.362
1.60	2.5	-1.462	-2.124	-2.650	-3.064	-3.400
	5.0	-1.185	-1.784	-2.257	-2.647	-2.958
	95.0	0.897	1.279	1.581	1.820	1.958
	97.5	1.124	1.638	2.041	2.363	2.594
1.50	2.5	-1.661	-2.470	-3.077	-3.540	-3.935
	5.0	-1.324	-2.026	-2.577	-3.027	-3.390
	95.0	0.984	1.439	1.746	1.971	2.191
	97.5	1.267	1.863	2.284	2.613	2.887
1.40	2.5	-1.950	-2.931	-3.692	-4.174	-4.678
	5.0	-1.518	-2.355	-2.990	-3.524	-3.992
	95.0	1.107	1.591	1.955	2.191	2.412
	97.5	1.465	2.128	2.586	2.931	3.283
1.30	2.5	-2.375	-3.555	-4.515	-5.098	-5.684
	5.0	-1.765	-2.793	-3.582	-4.214	-4.771
	95.0	1.244	1.820	2.197	2.515	2.737
	97.5	1.674	2.443	2.991	3.439	3.745
1.20	2.5	-2.966	-4.498	-5.640	-6.457	-7.181
	5.0	-2.139	-3.397	-4.358	-5.232	-5.920
	95.0	1.437	2.131	2.548	2.918	3.217
	97.5	2.018	2.993	3.536	4.094	4.544
1.10	2.5	-3.818	-5.845	-7.269	-8.381	-9.265
	5.0	-2.653	-4.337	-5.505	-6.677	-7.592
	95.0	1.680	2.496	3.064	3.510	3.871
	97.5	2.471	3.598	4.388	5.041	5.578
1.00	2.5	-5.214	-7.842	-10.044	-11.547	-12.783
	5.0	-3.467	-5.661	-7.362	-8.993	-10.361
	95.0	2.024	3.056	3.790	4.366	4.820
	97.5	3.135	4.619	5.633	6.428	7.148

Table 2. Finite-Sample Quantiles of the OVR Statistic: $T = 240$

α	%	$q = 2$	$q = 3$	$q = 4$	$q = 5$	$q = 6$
1.90	2.5	-0.973	-1.432	-1.770	-2.079	-2.332
	5.0	-0.820	-1.229	-1.532	-1.809	-2.034
	95.0	0.701	1.018	1.272	1.459	1.628
	97.5	0.851	1.246	1.575	1.824	2.063
1.80	2.5	-1.094	-1.607	-2.003	-2.322	-2.615
	5.0	-0.906	-1.357	-1.704	-1.988	-2.262
	95.0	0.761	1.124	1.376	1.596	1.764
	97.5	0.937	1.402	1.727	2.000	2.226
1.70	2.5	-1.212	-1.818	-2.266	-2.668	-3.011
	5.0	-0.991	-1.514	-1.912	-2.265	-2.570
	95.0	0.833	1.222	1.501	1.734	1.948
	97.5	1.030	1.539	1.901	2.192	2.501
1.60	2.5	-1.380	-2.086	-2.582	-3.091	-3.466
	5.0	-1.114	-1.705	-2.145	-2.591	-2.923
	95.0	0.911	1.356	1.687	1.913	2.122
	97.5	1.148	1.718	2.159	2.474	2.750
1.50	2.5	-1.641	-2.463	-3.116	-3.658	-4.098
	5.0	-1.275	-1.958	-2.526	-2.979	-3.408
	95.0	1.025	1.508	1.867	2.163	2.417
	97.5	1.323	1.983	2.428	2.851	3.171
1.40	2.5	-1.945	-2.964	-3.790	-4.455	-5.012
	5.0	-1.471	-2.301	-2.968	-3.567	-4.057
	95.0	1.156	1.726	2.166	2.489	2.753
	97.5	1.548	2.308	2.855	3.329	3.703
1.30	2.5	-2.365	-3.718	-4.661	-5.621	-6.247
	5.0	-1.722	-2.784	-3.581	-4.361	-4.955
	95.0	1.322	1.999	2.476	2.909	3.238
	97.5	1.823	2.737	3.379	3.942	4.404
1.20	2.5	-3.001	-4.758	-6.091	-7.180	-8.216
	5.0	-2.108	-3.413	-4.546	-5.421	-6.300
	95.0	1.571	2.383	2.987	3.516	3.883
	97.5	2.249	3.376	4.205	4.880	5.438
1.10	2.5	-3.938	-6.346	-8.121	-9.897	-11.107
	5.0	-2.596	-4.385	-5.838	-7.183	-8.384
	95.0	1.868	2.875	3.661	4.271	4.828
	97.5	2.844	4.277	5.316	6.259	6.989
1.00	2.5	-5.510	-9.078	-11.527	-14.054	-15.819
	5.0	-3.397	-5.844	-8.056	-9.852	-11.526
	95.0	2.346	3.640	4.741	5.474	6.200
	97.5	3.735	5.667	7.184	8.371	9.273

Table 3. Finite-Sample Quantiles of the OVR Statistic: $T = 600$

α	%	$q = 2$	$q = 3$	$q = 4$	$q = 5$	$q = 6$
1.90	2.5	-0.903	-1.332	-1.661	-1.933	-2.186
	5.0	-0.753	-1.125	-1.418	-1.655	-1.875
	95.0	0.682	0.998	1.260	1.464	1.636
	97.5	0.823	1.213	1.546	1.797	2.021
1.80	2.5	-1.013	-1.498	-1.895	-2.213	-2.504
	5.0	-0.838	-1.245	-1.590	-1.875	-2.127
	95.0	0.746	1.125	1.377	1.610	1.799
	97.5	0.909	1.373	1.698	2.006	2.249
1.70	2.5	-1.161	-1.737	-2.205	-2.558	-2.905
	5.0	-0.941	-1.418	-1.818	-2.125	-2.431
	95.0	0.835	1.241	1.566	1.814	2.027
	97.5	1.037	1.543	1.953	2.283	2.554
1.60	2.5	-1.340	-2.037	-2.580	-3.064	-3.436
	5.0	-1.063	-1.636	-2.086	-2.480	-2.821
	95.0	0.934	1.394	1.749	2.042	2.323
	97.5	1.186	1.787	2.234	2.635	2.980
1.50	2.5	-1.615	-2.448	-3.130	-3.667	-4.210
	5.0	-1.226	-1.901	-2.451	-2.906	-3.360
	95.0	1.056	1.599	2.026	2.363	2.629
	97.5	1.403	2.093	2.666	3.077	3.433
1.40	2.5	-1.947	-2.992	-3.851	-4.585	-5.218
	5.0	-1.436	-2.263	-2.926	-3.509	-4.073
	95.0	1.226	1.864	2.346	2.808	3.119
	97.5	1.657	2.529	3.122	3.732	4.162
1.30	2.5	-2.389	-3.803	-4.966	-5.970	-6.822
	5.0	-1.692	-2.734	-3.622	-4.385	-5.091
	95.0	1.429	2.215	2.826	3.288	3.749
	97.5	2.000	3.080	3.899	4.545	5.162
1.20	2.5	-3.099	-4.952	-6.600	-7.920	-9.075
	5.0	-2.091	-3.383	-4.629	-5.555	-6.550
	95.0	1.687	2.647	3.447	4.064	4.594
	97.5	2.506	3.852	4.992	5.897	6.521
1.10	2.5	-4.107	-6.749	-9.072	-11.070	-12.862
	5.0	-2.596	-4.441	-6.050	-7.534	-8.877
	95.0	2.073	3.335	4.322	5.142	5.952
	97.5	3.264	5.105	6.381	7.743	8.841
1.00	2.5	-5.582	-9.993	-13.509	-16.480	-19.318
	5.0	-3.358	-6.063	-8.422	-10.680	-12.759
	95.0	2.623	4.357	5.704	6.969	8.172
	97.5	4.391	7.162	9.247	10.831	12.819

Table 4. Finite-Sample Quantiles of the OVR Statistic: $T = 1200$

α	%	$q = 2$	$q = 3$	$q = 4$	$q = 5$	$q = 6$
1.90	2.5	-0.851	-1.266	-1.588	-1.869	-2.091
	5.0	-0.711	-1.067	-1.339	-1.589	-1.783
	95.0	0.663	0.991	1.238	1.435	1.612
	97.5	0.798	1.197	1.504	1.753	1.977
1.80	2.5	-0.972	-1.460	-1.824	-2.127	-2.422
	5.0	-0.805	-1.211	-1.520	-1.791	-2.036
	95.0	0.737	1.099	1.392	1.615	1.822
	97.5	0.904	1.352	1.712	1.994	2.253
1.70	2.5	-1.118	-1.699	-2.150	-2.530	-2.852
	5.0	-0.902	-1.372	-1.756	-2.069	-2.356
	95.0	0.834	1.256	1.554	1.823	2.069
	97.5	1.035	1.570	1.944	2.293	2.597
1.60	2.5	-1.336	-1.989	-2.543	-3.001	-3.440
	5.0	-1.053	-1.593	-2.024	-2.406	-2.759
	95.0	0.948	1.415	1.793	2.122	2.392
	97.5	1.221	1.822	2.290	2.704	3.054
1.50	2.5	-1.603	-2.421	-3.163	-3.711	-4.249
	5.0	-1.203	-1.861	-2.426	-2.895	-3.324
	95.0	1.091	1.642	2.108	2.435	2.766
	97.5	1.437	2.173	2.754	3.174	3.617
1.40	2.5	-1.921	-2.992	-3.894	-4.673	-5.401
	5.0	-1.405	-2.226	-2.892	-3.493	-4.044
	95.0	1.266	1.946	2.512	2.926	3.363
	97.5	1.731	2.636	3.412	3.959	4.523
1.30	2.5	-2.409	-3.920	-5.178	-6.085	-7.077
	5.0	-1.685	-2.752	-3.688	-4.370	-5.095
	95.0	1.487	2.344	2.952	3.514	4.073
	97.5	2.129	3.302	4.185	4.988	5.733
1.20	2.5	-3.144	-5.064	-6.777	-8.304	-9.567
	5.0	-2.076	-3.454	-4.663	-5.714	-6.649
	95.0	1.821	2.919	3.734	4.547	5.158
	97.5	2.707	4.322	5.534	6.725	7.461
1.10	2.5	-4.187	-7.123	-9.485	-11.965	-13.987
	5.0	-2.627	-4.505	-6.139	-7.715	-9.194
	95.0	2.223	3.618	4.776	5.799	6.712
	97.5	3.572	5.638	7.464	8.898	10.312
1.00	2.5	-5.671	-10.628	-14.377	-17.975	-21.214
	5.0	-3.372	-6.286	-8.655	-10.941	-13.198
	95.0	2.781	4.671	6.598	7.914	9.360
	97.5	4.771	7.948	10.681	12.908	15.198

Table 5. Finite-Sample Quantiles of the OVR Statistic: $T = 2400$

α	%	$q = 2$	$q = 3$	$q = 4$	$q = 5$	$q = 6$
1.90	2.5	-0.822	-1.214	-1.526	-1.809	-2.031
	5.0	-0.682	-1.019	-1.285	-1.521	-1.709
	95.0	0.649	0.972	1.213	1.414	1.590
	97.5	0.779	1.172	1.476	1.712	1.931
1.80	2.5	-0.942	-1.411	-1.786	-2.098	-2.343
	5.0	-0.773	-1.167	-1.468	-1.743	-1.955
	95.0	0.738	1.106	1.377	1.616	1.816
	97.5	0.901	1.351	1.694	1.982	2.249
1.70	2.5	-1.107	-1.658	-2.105	-2.486	-2.830
	5.0	-0.889	-1.350	-1.717	-2.022	-2.307
	95.0	0.837	1.255	1.572	1.840	2.096
	97.5	1.049	1.571	1.967	2.299	2.630
1.60	2.5	-1.307	-2.004	-2.531	-2.974	-3.402
	5.0	-1.020	-1.574	-1.989	-2.360	-2.712
	95.0	0.952	1.447	1.825	2.134	2.449
	97.5	1.222	1.859	2.330	2.739	3.129
1.50	2.5	-1.594	-2.421	-3.176	-3.721	-4.277
	5.0	-1.182	-1.849	-2.413	-2.865	-3.303
	95.0	1.109	1.681	2.138	2.568	2.893
	97.5	1.479	2.250	2.838	3.348	3.827
1.40	2.5	-1.982	-3.053	-3.936	-4.727	-5.427
	5.0	-1.414	-2.234	-2.911	-3.475	-4.068
	95.0	1.284	1.997	2.589	3.068	3.530
	97.5	1.771	2.727	3.545	4.167	4.834
1.30	2.5	-2.460	-3.902	-5.207	-6.326	-7.429
	5.0	-1.692	-2.739	-3.649	-4.452	-5.220
	95.0	1.551	2.441	3.120	3.836	4.363
	97.5	2.256	3.551	4.498	5.477	6.157
1.20	2.5	-3.214	-5.355	-6.994	-8.619	-9.854
	5.0	-2.086	-3.503	-4.688	-5.824	-6.669
	95.0	1.845	3.026	4.011	4.877	5.645
	97.5	2.837	4.636	6.062	7.262	8.328
1.10	2.5	-4.247	-7.355	-9.965	-12.363	-14.830
	5.0	-2.622	-4.563	-6.312	-7.886	-9.412
	95.0	2.334	3.872	5.224	6.298	7.411
	97.5	3.809	6.230	8.282	9.993	11.649
1.00	2.5	-6.028	-10.768	-14.925	-18.628	-22.245
	5.0	-3.460	-6.388	-8.849	-11.183	-13.564
	95.0	2.932	5.162	7.035	8.828	10.358
	97.5	5.208	8.930	11.983	15.049	17.285

Figure 1: Asmptotic Distribution of the OVR Statistic: q=2

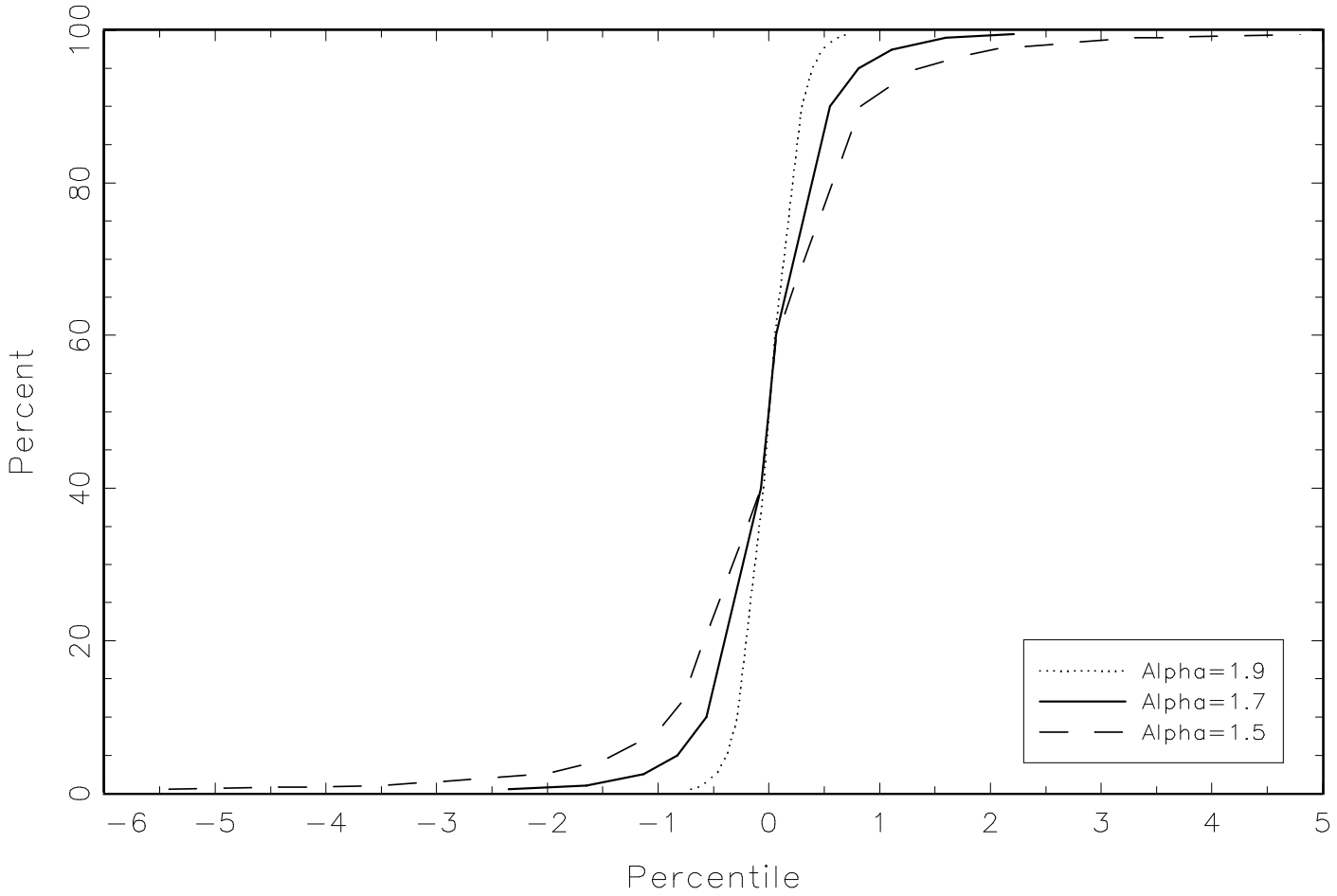

Figure 2: Asmptotic Distribution of the OVR Statistic: q=4

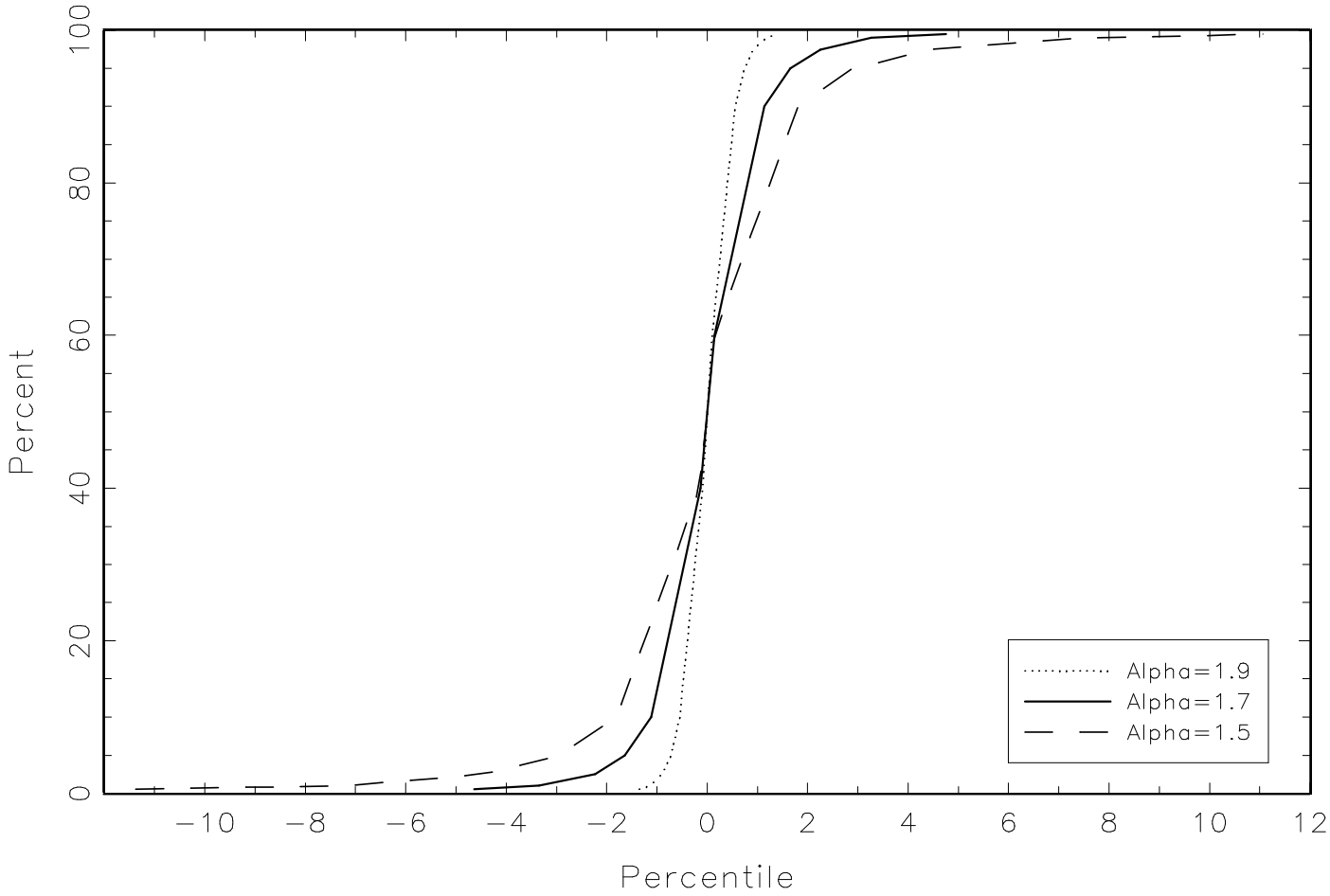

Figure 3: Asmptotic Distribution of the OVR Statistic: q=6

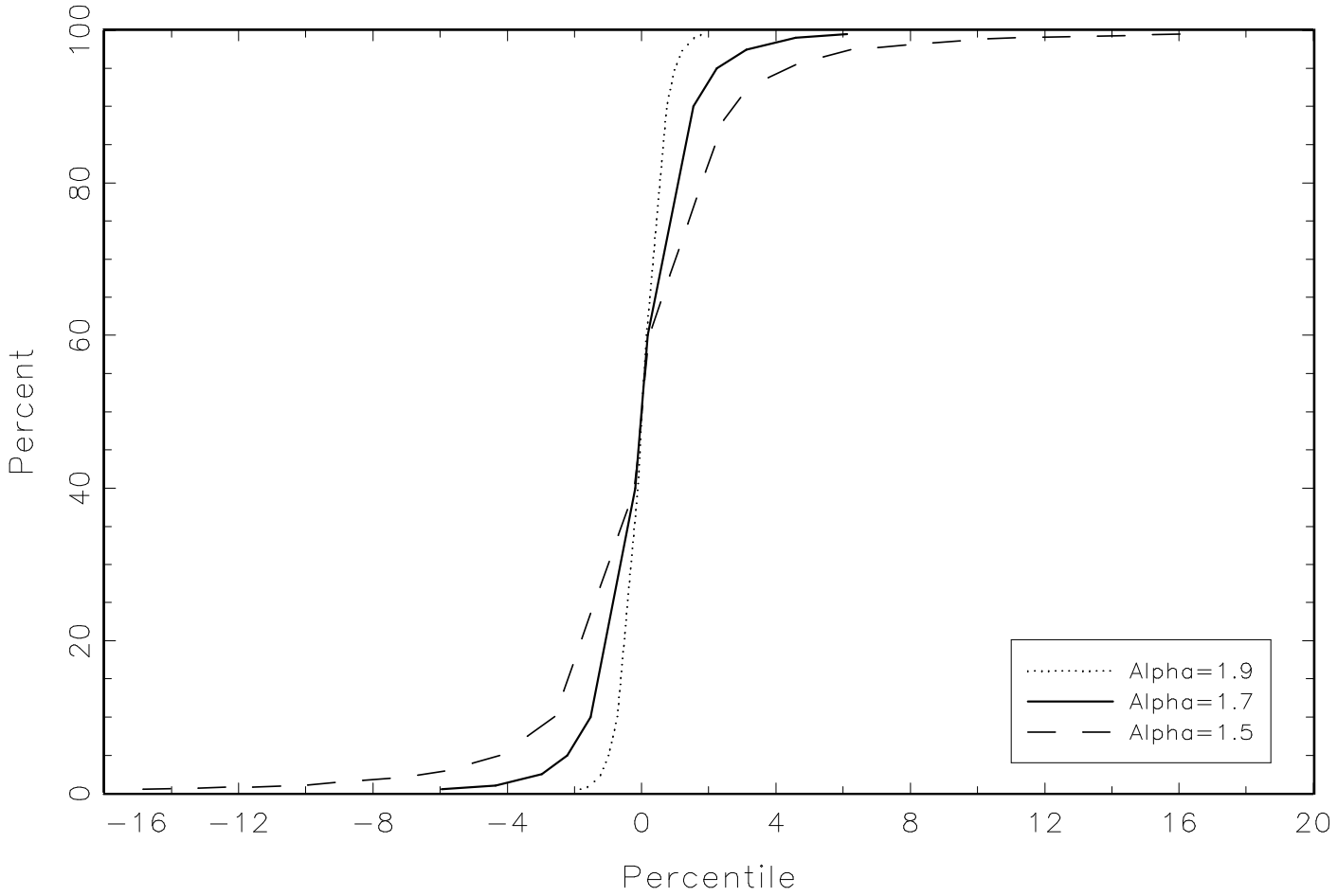

Figure 4: EQF versus Asmptotic Distribution of the OVR Statistic

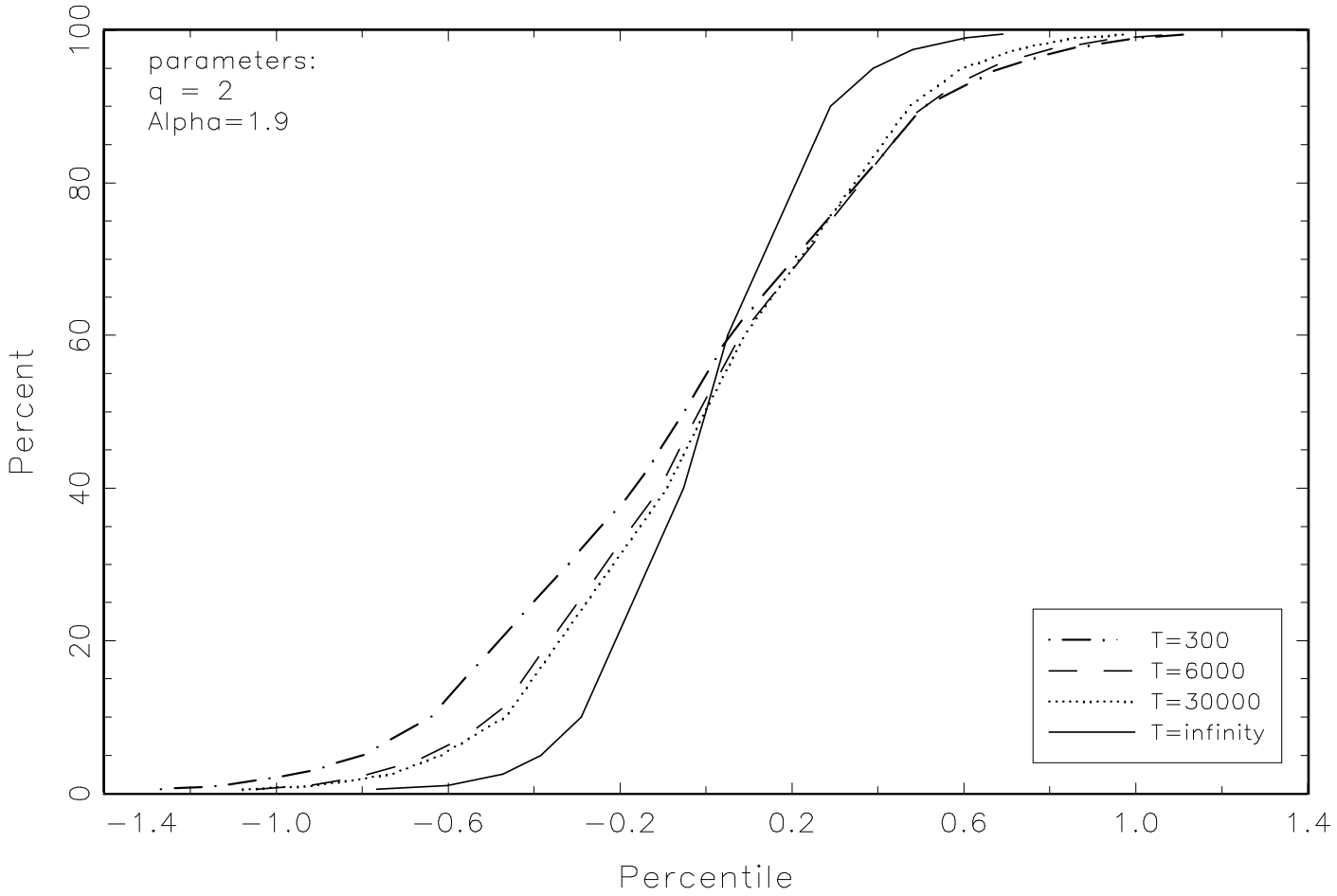

Figure 5: EQF versus Asmptotic Distribution of the OVR Statistic

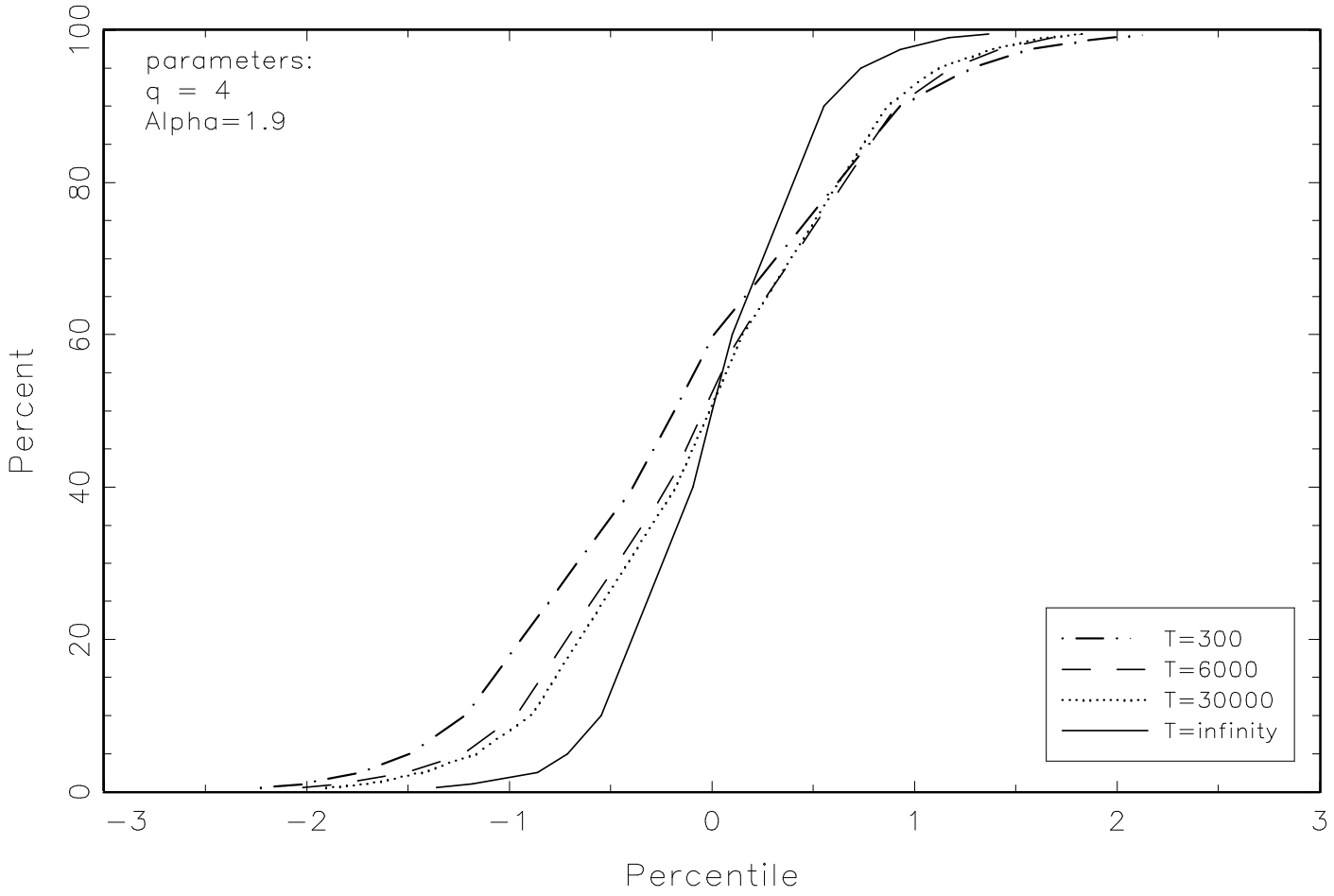

Figure 6: EQF versus Asmptotic Distribution of the OVR Statistic

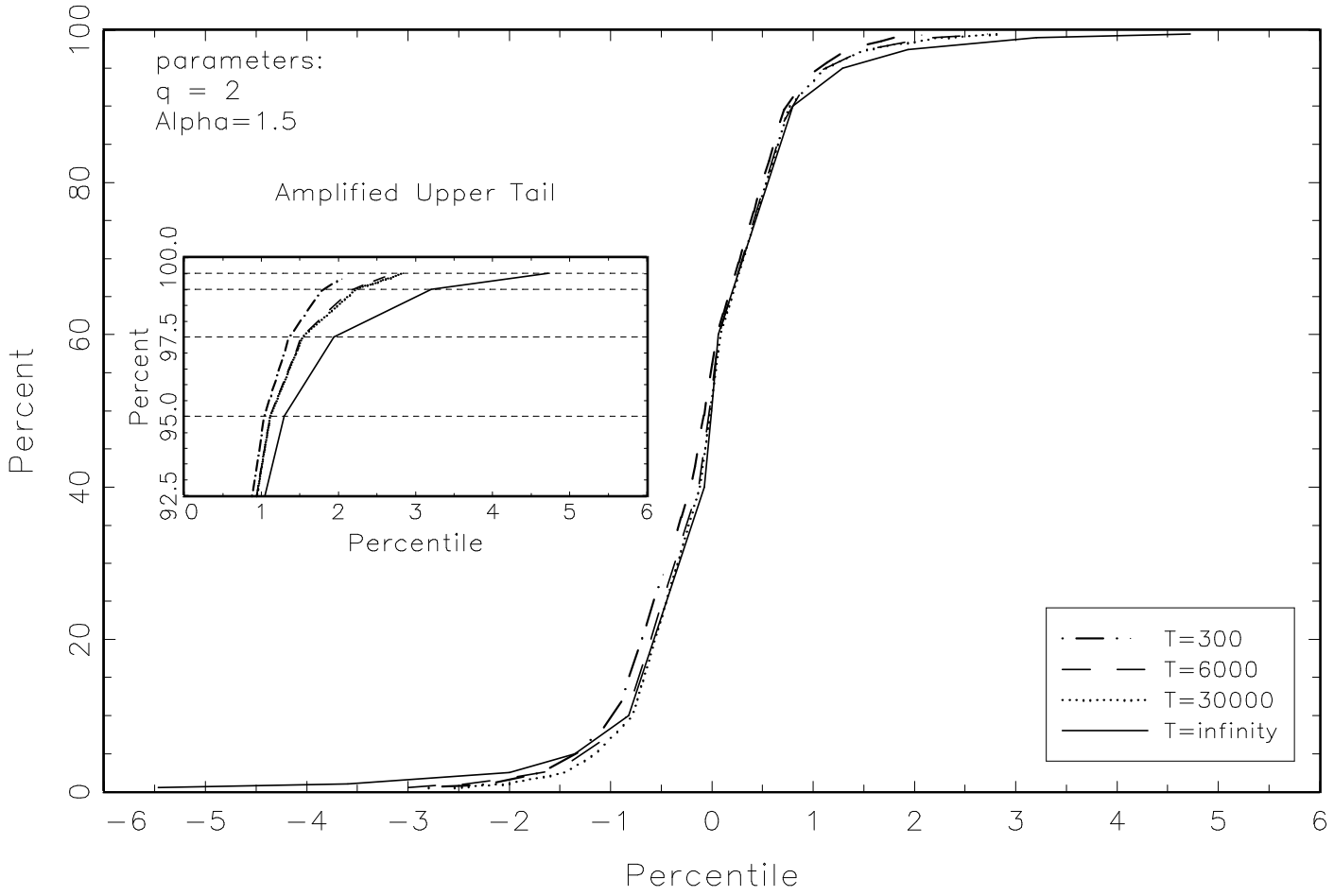

Figure 7: EQF versus Asmptotic Distribution of the OVR Statistic

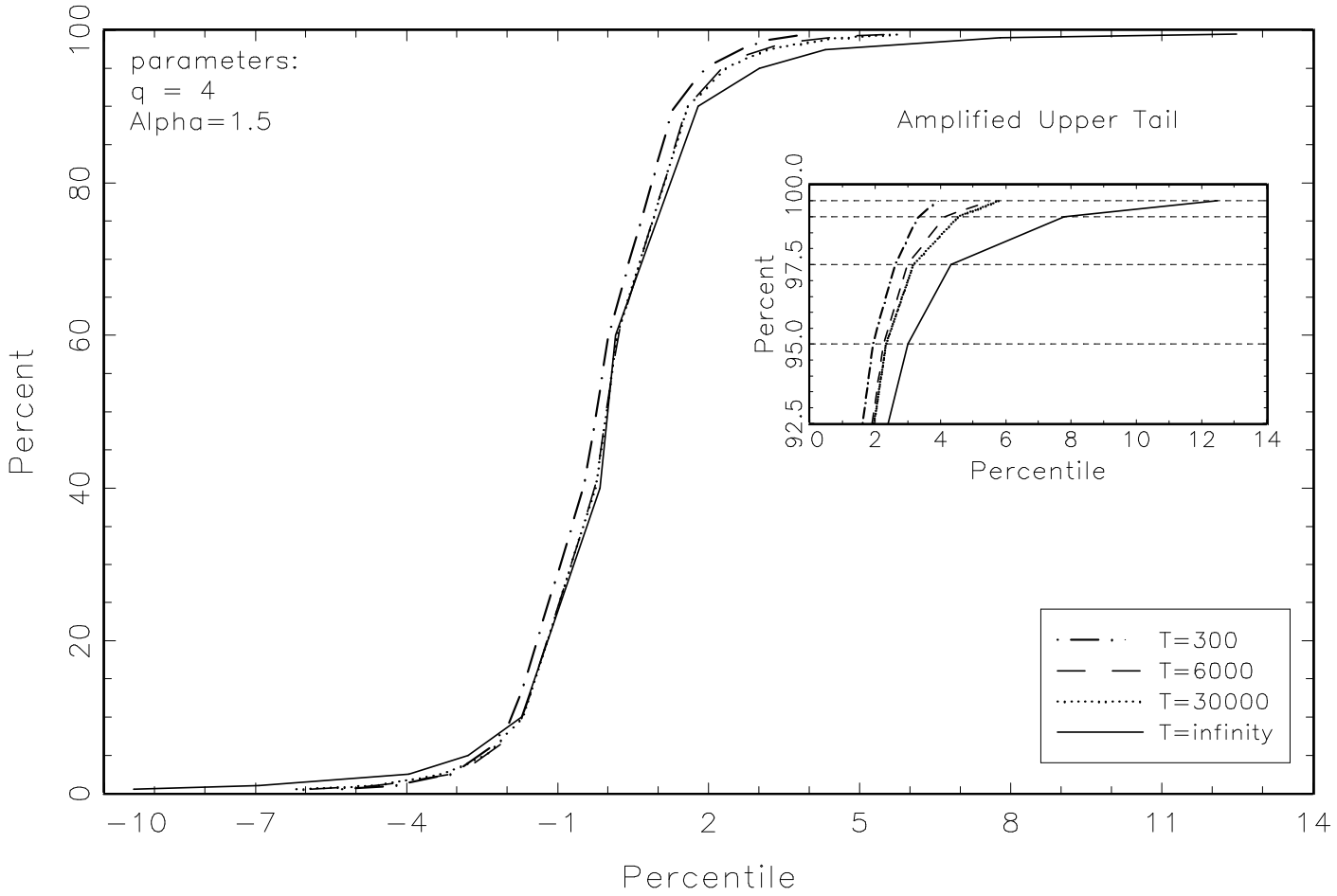

Figure 8: EQF versus Asmptotic Distribution of the OVR Statistic

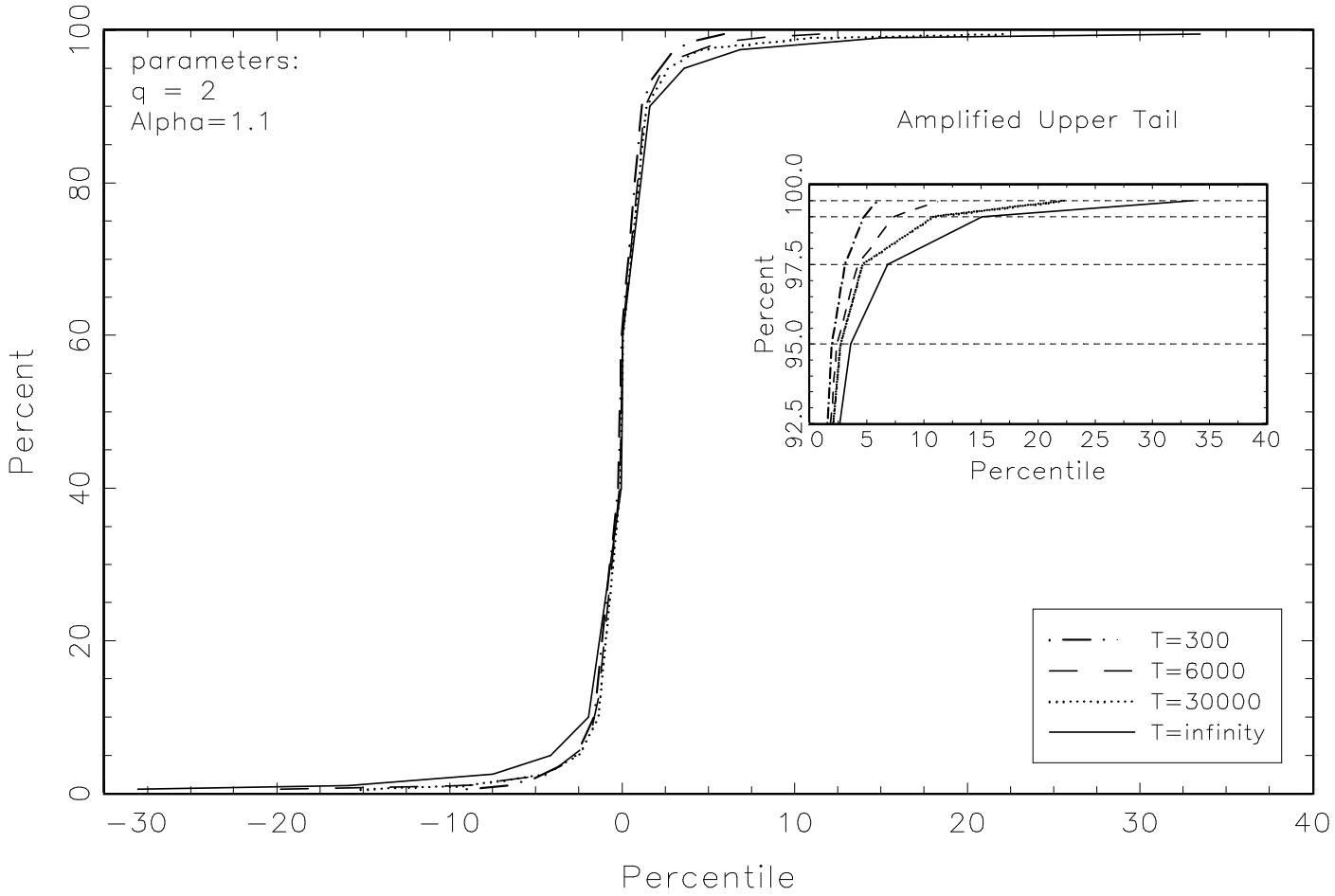

Figure 9: EQF versus Asmptotic Distribution of the OVR Statistic