

1 Results

1.1 Single-Minded

Single-Minded, Uniform Reward, Over Demanded, 10 bidders, 10 goods

	Welfare	Revenue	EF	EFLoss	MC	MC Loss	Time
Huang et. al.	0.9712	0.9712	0.0702	0.3320	0.0000	0.0000	0.0000
Guruswami et. al. Unl. Supply	0.8658	0.8658	0.0000	0.0000	0.3535	0.3535	0.0002
LP greedy utilitarian	0.9863	0.9863	0.0010	0.0014	0.0929	0.1717	0.0000
LP greedy egalitarian	0.6785	0.6785	0.1326	0.1451	0.1338	0.3197	0.0000
LP optimal utilitarian	1.0000	1.0000	0.0012	0.0014	0.0820	0.1524	0.0117
LP optimal egalitarian	0.7031	0.7031	0.1363	0.1475	0.1156	0.2877	0.0115

Single-Minded, Uniform Reward, Under Demanded, 10 bidders, 10 goods

	Welfare	Revenue	EF	EFLoss	MC	MC Loss	Time
Huang et. al.	0.9945	0.9945	0.0095	0.0316	0.0000	0.0000	0.0000
Guruswami et. al. Unl. Supply	0.6050	0.6050	0.0000	0.0000	0.7800	0.7800	0.0001
LP greedy utilitarian	0.9977	0.9977	0.0000	0.0000	0.0227	0.0547	0.0000
LP greedy egalitarian	0.8932	0.8932	0.0718	0.1125	0.0317	0.0991	0.0000
LP optimal utilitarian	1.0000	1.0000	0.0000	0.0000	0.0211	0.0511	0.0078
LP optimal egalitarian	0.9000	0.9000	0.0729	0.1131	0.0288	0.0913	0.0076

Single-Minded, Elitist Reward, Over Demanded, 10 bidders, 10 goods

	Welfare	Revenue	EF	EFLoss	MC	MC Loss	Time
Huang et. al.	0.9591	0.9591	0.0707	0.3328	0.0000	0.0000	0.0000
Guruswami et. al. Unl. Supply	0.9150	0.9150	0.0000	0.0000	0.3535	0.3535	0.0005
LP greedy utilitarian	0.9927	0.9927	0.0007	0.0010	0.0861	0.1109	0.0000
LP greedy egalitarian	0.5191	0.5191	0.1343	0.2161	0.1318	0.3788	0.0000
LP optimal utilitarian	1.0000	1.0000	0.0008	0.0013	0.0793	0.1004	0.0112
LP optimal egalitarian	0.5391	0.5391	0.1402	0.2278	0.1129	0.3424	0.0127

Single-Minded, Elitist Reward, Under Demanded, 10 bidders, 10 goods

	Welfare	Revenue	EF	EFLoss	MC	MC Loss	Time
Huang et. al.	0.9955	0.9955	0.0092	0.0306	0.0000	0.0000	0.0000
Guruswami et. al. Unl. Supply	0.7045	0.7045	0.0000	0.0000	0.7800	0.7800	0.0001
LP greedy utilitarian	0.9990	0.9990	0.0000	0.0000	0.0212	0.0410	0.0000
LP greedy egalitarian	0.8494	0.8494	0.0722	0.1430	0.0300	0.1033	0.0000
LP optimal utilitarian	1.0000	1.0000	0.0000	0.0000	0.0205	0.0393	0.0077
LP optimal egalitarian	0.8536	0.8536	0.0728	0.1438	0.0275	0.0982	0.0078

1.2 Singleton

Singleton, Uniform Reward, Over Demanded, 10 bidders, 9 goods

	Welfare	Revenue	EF	EFLoss	MC	MC Loss	Time
Guruswami Envy-Free Approx.	0.9511	0.8287	0.0000	0.0000	0.1066	0.1044	0.0000
LP greedy utilitarian	0.9198	0.8193	0.0094	0.0111	0.1282	0.1312	0.0062
LP greedy egalitarian	0.8776	0.7619	0.0472	0.0687	0.1552	0.1498	0.0059
LP optimal utilitarian	0.9461	0.8398	0.0000	0.0000	0.1006	0.1026	0.0945
LP optimal egalitarian	0.9060	0.7914	0.0387	0.0548	0.1262	0.1230	0.1584

Singleton, Uniform Reward, Under Demanded, 10 bidders, 10 goods

	Welfare	Revenue	EF	EFLoss	MC	MC Loss	Time
Guruswami Envy-Free Approx.	0.8742	0.7302	0.0000	0.0000	0.5281	0.5220	0.0000
LP greedy utilitarian	0.8806	0.7755	0.0013	0.0015	0.4703	0.4907	0.0043
LP greedy egalitarian	0.8728	0.7620	0.0046	0.0062	0.4861	0.4978	0.0060
LP optimal utilitarian	0.8939	0.7950	0.0000	0.0000	0.4602	0.4832	0.2646
LP optimal egalitarian	0.8925	0.7934	0.0020	0.0019	0.4645	0.4860	0.2690

Singleton, Elitist Reward, Over Demanded, 10 bidders, 9 goods

	Welfare	Revenue	EF	EFLoss	MC	MC Loss	Time
Guruswami Envy-Free Approx.	0.9112	0.8573	0.0000	0.0000	0.3399	0.3352	0.0000
LP greedy utilitarian	0.9055	0.8598	0.0042	0.0047	0.3142	0.3140	0.0055
LP greedy egalitarian	0.8532	0.7198	0.0368	0.0739	0.2964	0.2782	0.0068
LP optimal utilitarian	0.9211	0.8743	0.0000	0.0000	0.2948	0.2997	0.1092
LP optimal egalitarian	0.8778	0.7533	0.0308	0.0595	0.2698	0.2619	0.1400

Singleton, Elitist Reward, Under Demanded, 10 bidders, 10 goods

	Welfare	Revenue	EF	EFLoss	MC	MC Loss	Time
Guruswami Envy-Free Approx.	0.8658	0.7811	0.0000	0.0000	0.6429	0.6337	0.0000
LP greedy utilitarian	0.8866	0.8258	0.0008	0.0010	0.5538	0.5740	0.0051
LP greedy egalitarian	0.8807	0.8124	0.0028	0.0044	0.5716	0.5775	0.0053
LP optimal utilitarian	0.8984	0.8410	0.0000	0.0000	0.5394	0.5682	0.2759
LP optimal egalitarian	0.8972	0.8390	0.0013	0.0017	0.5433	0.5703	0.2682

1.3 Size-Interchangeable

Size-Interchangeable, Uniform Reward, Over Demanded, 10 bidders, 9 goods

	Welfare	Revenue	EF	EFLoss	MC	MC Loss	Time
Simple Pricing	0.8467	0.6160	0.0046	0.0063	0.2904	0.2904	0.0037
LP greedy utilitarian	0.8563	0.6533	0.0175	0.0304	0.1702	0.1595	0.0098
LP greedy egalitarian	0.8480	0.6474	0.0093	0.0152	0.1852	0.1726	0.0093
LP optimal utilitarian	0.8730	0.6703	0.0110	0.0202	0.1639	0.1540	0.4066
LP optimal egalitarian	0.8590	0.6614	0.0086	0.0156	0.1790	0.1663	0.3073

Size-Interchangeable, Uniform Reward, Under Demanded, 10 bidders, 10 goods

	Welfare	Revenue	EF	EFLoss	MC	MC Loss	Time
Simple Pricing	0.8683	0.7141	0.0045	0.0047	0.4355	0.4355	0.0007
LP greedy utilitarian	0.8943	0.7628	0.0297	0.0442	0.1854	0.1909	0.0057
LP greedy egalitarian	0.8745	0.7408	0.0259	0.0341	0.2054	0.2086	0.0044
LP optimal utilitarian	0.9100	0.7759	0.0211	0.0301	0.2517	0.2596	0.2004
LP optimal egalitarian	0.8891	0.7590	0.0192	0.0244	0.2737	0.2791	0.1358

Size-Interchangeable, Elitist Reward, Over Demanded, 10 bidders, 9 goods

	Welfare	Revenue	EF	EFLoss	MC	MC Loss	Time
Simple Pricing	0.8261	0.6895	0.0021	0.0027	0.4702	0.4702	0.0032
LP greedy utilitarian	0.8402	0.7240	0.0097	0.0179	0.3456	0.3075	0.0223
LP greedy egalitarian	0.8372	0.7212	0.0048	0.0083	0.3509	0.3122	0.0089
LP optimal utilitarian	0.8513	0.7351	0.0062	0.0116	0.3459	0.3126	0.4274
LP optimal egalitarian	0.8456	0.7300	0.0043	0.0091	0.3547	0.3191	0.3558

Size-Interchangeable, Elitist Reward, Under Demanded, 10 bidders, 10 goods

	Welfare	Revenue	EF	EFLoss	MC	MC Loss	Time
Simple Pricing	0.8714	0.7719	0.0024	0.0025	0.5363	0.5363	0.0015
LP greedy utilitarian	0.8936	0.8118	0.0221	0.0373	0.2912	0.2875	0.0066
LP greedy egalitarian	0.8823	0.7980	0.0167	0.0224	0.3087	0.2998	0.0056
LP optimal utilitarian	0.9084	0.8221	0.0154	0.0235	0.3564	0.3546	0.2193
LP optimal egalitarian	0.8950	0.8107	0.0129	0.0167	0.3749	0.3702	0.1659