1 Supplementary material

Table 1: Comparison of k-greedy and k-MAX under the treewidths $k \in \{2, 5, 8\}$.

		2		5		8	
name	n_var	k-greedy	k-MAX	k-greedy	k-MAX	k-greedy	k-MAX
kdd.test	64	-76359	-76253	-74202	-74164	-74203	-74179
kdd.ts	64	-457467	-456449	-436621	-435997	-436421	-436071
kdd.valid	64	-50783	-50647	-49379	-49308	-49401	-49342
plants.test	69	-60334	-57892	-51484	-51824	-51322	-51185
plants.ts	69	-295218	-284122	-248412	-247957	-245602	-246379
plants.valid	69	-40153	-38655	-34752	-34976	-34465	-34712
baudio.test	100	-133949	-133500	-128080	-127541	-127734	-127422
baudio.ts	100	-667835	-665988	-631818	-626521	-628926	-625106
baudio.valid	100	-88798	-88569	-85536	-85221	-85354	-85138
bnetflix.test	100	-181980	-181628	-177709	-177497	-177508	-177350
bnetflix.ts	100	-907069	-905099	-878258	-875164	-876184	-874149
bnetflix.valid	100	-121426	-121109	-118936	-118729	-118743	-118527
jester.test	100	-240489	-239734	-229137	-228688	-228831	-228627
jester.ts	100	-526346	-525134	-499610	-498142	-499016	-497314
jester.valid	100	-58610	-58464	-57055	-56939	-56936	-56868
accidents.test	111	-86417	-85806	-76722	-76155	-76147	-75442
accidents.ts	111	-427788	-425335	-372510	-367430	-367126	-361493
accidents.valid	111	-57285	-56929	-51249	-50848	-51005	-50602
tretail.test	135	-48928	-48877	-48916	-48865	-48920	-48875
tretail.ts	135	-239822	-239652	-239283	-239193	-239273	-239222
tretail.valid	135	-32766	-32718	-32742	-32702	-32745	-32708
pumsb_star.test	163	-79008	-79111	-68279	-67502	-68403	-66724
pumsb_star.ts	163	-392184	-389491	-339578	-335995	-339585	-333782
pumsb_star.valid	163	-53200	-53010	-46044	-44863	-45935	-44541

Table 2: Comparison of k-greedy and k-MAX under the treewidths $k \in \{2, 5, 8\}$.

		2		5		8	
name	n_var	k-greedy	k-MAX	k-greedy	k-MAX	k-greedy	k-MAX
dna.test	180	-106023	-105038	-97848	-97086	-97812	-97117
dna.ts	180	-142943	-141563	-131436	-130289	-131355	-130312
dna.valid	180	-36236	-35909	-33772	-33513	-33761	-33522
kosarek.test	190	-77705	-77575	-76330	-76314	-76356	-76311
kosarek.ts	190	-392224	-391531	-376124	-376864	-376678	-375661
kosarek.valid	190	-53389	-53132	-52517	-52435	-52473	-52431
msweb.test	294	-53109	-52817	-52641	-52665	-52585	-52659
msweb.ts	294	-303072	-301231	-296773	-296794	-295585	-296352
msweb.valid	294	-34784	-34590	-34531	-34442	-34483	-34433
book.test	500	-65704	-65295	-65352	-65060	-65334	-64993
book.ts	500	-326450	-325069	-318737	-318265	-318408	-318046
book.valid	500	-42710	-42309	-42621	-42332	-42563	-42355
tmovie.test	500	-38592	-37877	-36646	-36250	-36537	-36095
tmovie.ts	500	-303652	-299769	-275512	-271459	-273925	-271116
tmovie.valid	500	-70074	-69131	-65771	-65426	-65632	-65107
cwebkb.test	839	-138314	-137587	-137177	-136826	-137037	-136606
cwebkb.ts	839	-446749	-444607	-438610	-438015	-437847	-437487
cwebkb.valid	839	-94104	-93239	-93563	-93022	-93504	-93056
cr52.test	889	-144022	-142457	-140913	-140088	-140734	-140119
cr52.ts	889	-691236	-686454	-664996	-663621	-665477	-662773
cr52.valid	889	-103783	-102602	-102188	-101558	-101973	-101722
c20ng.test	910	-608599	-606308	-599667	-597950	-599223	-596822
c20ng.ts	910	-1685925	-1680619	-1646556	-1652194	-1645418	-1639579
c20ng.valid	910	-477884	-476102	-472135	-471833	-471587	-470940
bbc.test	1058	-87071	-86497	-86863	-86536	-86877	-86486
bbc.ts	1058	-428166	-426572	-424593	-423955	-424274	-423823
bbc.valid	1058	-57586	-57011	-57504	-57188	-57473	-57089
ad.test	1556	-17301	-16977	-17206	-16839	-17234	-16833
ad.ts	1556	-54600	-52366	-53415	-51419	-53355	-51160
ad.valid	1556	-14274	-13990	-14251	-13934	-14257	-13937

Table 3: Comparison of k-greedy and k-MAX under the treewidths $k \in \{2, 5, 8\}$.

		2		5		8	
name	n_var	k-greedy	k-MAX	k-greedy	k-MAX	k-greedy	k-MAX
andes	223	-660512	-654425	-629809	-614175	-627719	-612953
diabetes	413	-4052299	-4148433	-3950062	-4094168	-3946979	-4094172
link	724	-2474593	-2394336	-2358155	-2267993	-2356919	-2265242
munin	1041	-5167248	-4975906	-5083008	-4914103	-5084369	-4911622
pigs	441	-2210735	-2219937	-2138019	-2109816	-2133376	-2105381
random2000-0	2000	-9807093	-9718938	-9755342	-9663805	-9757462	-9662793
random2000-1	2000	-9831129	-9741798	-9782803	-9698325	-9786559	-9698248
random2000-2	2000	-9676913	-9593266	-9631922	-9540100	-9630987	-9538265
random2000-3	2000	-9770440	-9679008	-9721281	-9630520	-9721068	-9628918
random2000-4	2000	-9690487	-9675321	-9681224	-9641275	-9658620	-9639742
random4000-0	4000	-19525259	-19334851	-19448114	-19260439	-19446565	-19259249
random4000-1	4000	-19319405	-19137788	-19246500	-19063269	-19244854	-19061215
random4000-2	4000	-19513696	-19337770	-19445395	-19260466	-19446148	-19262246
random4000-3	4000	-19508515	-19321921	-19431674	-19245901	-19438840	-19244066
random4000-4	4000	-19423304	-19237952	-19351166	-19165425	-19352331	-19164519
random10000-0	10000	-48866475	-48408465	-48774846	-48374811	-48773603	-48373347
random10000-1	10000	-48432799	-47962247	-48339683	-47928900	-48341741	-47929162
random10000-2	10000	-48340830	-47857063	-48236776	-47822630	-48239831	-47821827
random10000-3	10000	-48767158	-48283494	-48671208	-48252471	-48666772	-48252095
random10000-4	10000	-48476351	-47992086	-48374902	-47953307	-48370772	-47952288

Table 4: Log-likelihood comparison of Chordalysis and k-MAX under various treewidth.

name	Chordalysis	k-MAX 2	k-MAX 5	k-MAX 8
accidents.test	-29.29	-33.29	-28.70	-28.21
accidents.ts	-28.06	-33.26	-28.59	-27.97
accidents.valid	-29.52	-33.00	-28.54	-28.07
ad.test	-40.82	-14.89	-14.46	-14.41
ad.ts	-16.22	-16.32	-15.54	-15.44
ad.valid	-52.07	-15.23	-14.94	-14.83
baudio.test	-42.38	-44.23	-41.49	-41.45
baudio.ts	-41.57	-44.34	-41.48	-41.28
baudio.valid	-42.20	-43.90	-41.33	-41.24
bbc.test	-269.88	-243.43	-242.70	-242.17
bbc.ts	-254.34	-250.90	-247.03	-246.83
bbc.valid	-262.77	-227.96	-227.87	-227.22
bnetflix.test	-58.73	-60.28	-58.27	-58.15
bnetflix.ts	-58.16	-60.28	-58.09	-57.83
bnetflix.valid	-58.90	-60.17	-58.29	-58.13
book.test	-38.05	-35.39	-34.75	-34.65
book.ts	-35.99	-36.86	-35.37	-35.32
book.valid	-37.75	-33.47	-33.18	-33.03
c20ng.test	-157.99	-159.10	-154.49	-154.09
c20ng.ts	-143.91	-148.08	-143.27	-143.38
c20ng.valid	-124.65	-124.49	-121.35	-121.11
cr52.test	-91.90	-88.27	-84.92	-84.52
cr52.ts	-100.14	-103.88	-98.96	-98.41
cr52.valid	-100.92	-93.81	-91.12	-90.91
cwebkb.test	-165.28	-157.32	-154.44	-153.51
cwebkb.ts	-154.33	-156.46	-151.74	-151.31
cwebkb.valid	-171.87	-157.60	-155.16	-154.41
dna.test	-80.46	-87.49	-80.23	-80.18
dna.ts	-80.34	-87.65	-80.11	-80.09
dna.valid	-81.41	-87.07	-79.91	-79.86
jester.test	-55.15	-58.04	-54.66	-54.44
jester.ts	-55.06	-58.25	-54.86	-54.54
jester.valid	-56.30	-57.77	-55.08	-54.97
kdd.test	-2.10	-2.16	-2.08	-2.07
kdd.ts	-2.41	-2.53	-2.41	-2.40
kdd.valid	-2.45	-2.51	-2.41	-2.41
kosarek.test	-11.26	-11.37	-10.96	-10.98
kosarek.ts	-11.09	-11.67	-11.10	-11.09
kosarek.valid	-11.54	-11.58	-11.22	-11.18
msweb.test	-10.23	-10.06	-9.97	-9.95
msweb.ts	-9.95	-10.13	-9.94	-9.91
msweb.valid	-10.13	-9.85	-9.76	-9.74
plants.test	-14.87	-16.46	-14.35	-14.19
plants.ts	-14.13	-16.28	-14.09	-13.90
plants.valid	-14.88	-16.42	-14.35	-14.16
pumsb.test	-27.38	-31.74	-26.66	-26.11
pumsb.ts	-26.12	-31.64	-27.29	-27.02
pumsb.valid	-27.89	-31.69	-26.47	-25.90
tmovie.test	-61.94	-58.65	-53.34	-53.03
tmovie.ts	-59.32	-65.31	-57.30	-56.96
tmovie.valid	-65.32	-65.58	-58.73	-58.73
tretail.test	-10.98	-10.83	-10.82	-10.82
tretail.ts	-10.82	-10.81	-10.77	-10.77
tretail.valid	-11.00	-10.77	-10.75	-10.75

Table 5: MAE comparison of Chordalysis and k-MAX under various treewidths.

name	Chordalysis	k-MAX 2	k-MAX 5	k-MAX 8
andes	0.41792	0.03690	0.03943	0.03973
diabetes	0.00024	0.00024	0.00024	0.00024
link	0.02801	0.02562	0.02226	0.02250
munin	0.07695	0.07505	0.07599	0.07382
pigs	0.01831	0.02071	0.01935	0.01929
random2000-0	0.03837	0.03873	0.03851	0.03796
random2000-1	0.02682	0.02530	0.02501	0.02503
random2000-2	0.03783	0.03736	0.03753	0.03750
random2000-3	0.02759	0.02778	0.02746	0.02662
random2000-4	0.02732	0.02689	0.02684	0.02687

Table 6: Time comparison of Chordalysis and k-MAX under various treewidths.

name	Chordalysis	k-MAX 2	k-MAX 5	k-MAX 8
andes	0.215	0.2	0.205	0.212
diabetes	6.896	3.73	4.3935	4.507
link	2.494	1.404	1.651	1.893
munin	5.524	3.963	3.9075	4.933
pigs	1.999	1.255	2.2135	2.352
random2000-0	2.852	2.702	2.6755	2.677
random2000-1	2.249	2.124	2.3435	2.573
random2000-2	2.23	1.625	1.647	1.68
random2000-3	1.753	1.322	1.3295	1.395
random2000-4	1.432	1.161	1.2685	1.31

Table 7: Experimental results on sub-graph sampling for PolBlogs.

Name	#EDGES	ACC	AUC	MAP	#ITERS	#UPDATES
ORIGINAL	16714	0.9534	0.9807	0.9798	4	66856
IDSIA-TW5	3469	0.938	0.9673	0.9668	3	10407
IDSIA-TW6	3860	0.9401	0.9682	0.9664	3	11581
IDSIA-TW7	4188	0.9408	0.9689	0.9669	3	12564
IDSIA-TW8	4438	0.9394	0.9674	0.9648	3	13314
IDSIA-TW9	4677	0.9372	0.9677	0.966	3	14031
RW-1	3469	0.7813	0.9086	0.8951	3	10407
RW-2	3860	0.7932	0.9134	0.8936	3	11581
RW-3	4188	0.8014	0.9216	0.9055	3	12564
RW-4	4438	0.8022	0.925	0.9148	3	13314
RW-5	4677	0.8034	0.9241	0.9078	3	14031
MRJ-1	3469	0.7986	0.9138	0.8975	3	10407
MRJ-2	3860	0.8085	0.9136	0.9031	3	11581
MRJ-3	4188	0.8103	0.9219	0.9075	3	12564
MRJ-4	4438	0.8251	0.9319	0.9196	3	13314
MRJ-5	4677	0.8239	0.9318	0.9194	3	14031

Table 8: Experimental results on sub-graph sampling for PubMed.

Name	#EDGES	ACC	AUC	MAP	#ITERS	#UPDATES
ORIGINAL	44324	0.8803	0.9009	0.8386	3	132972
IDSIA-5	24908	0.8682	0.8961	0.8265	3	74725
IDSIA-6	25061	0.8684	0.8962	0.8276	3	75183
IDSIA-7	25175	0.8677	0.8955	0.8259	3	75526
IDSIA-8	25256	0.8689	0.8962	0.8271	3	75767
IDSIA-10	25429	0.8689	0.8966	0.8274	3	76287
RW-5	24908	0.7216	0.8158	0.6932	3	74724
RW-6	25061	0.706	0.7895	0.6247	3	75183
RW-7	25175	0.7247	0.8153	0.6805	3	75525
RW-8	25256	0.7139	0.8032	0.6605	3	75768
RW-10	25429	0.7251	0.8151	0.6744	3	76287
MRJ-5	24908	0.7247	0.8104	0.6665	3	74724
MRJ-6	25061	0.7253	0.8113	0.6707	3	75183
MRJ-7	25175	0.7264	0.8119	0.6704	3	75525
MRJ-8	25256	0.7305	0.8168	0.6778	3	75768
MRJ-10	25429	0.7268	0.813	0.6743	3	76287

Table 9: Experimental results on sub-graph sampling for Campaigns.

NAME	#EDGES	ACC	AUC	MAP	#ITERS	#UPDATES
ORIGINAL	95397	0.8229	0.836	0.8845	8.3	794975
IDSIA-5	7843	0.8274	0.8979	0.9138	3	23882
IDSIA-6	8341	0.8454	0.9093	0.9132	3	25211
IDSIA-7	8643	0.8551	0.9125	0.9226	3.1	26410
IDSIA-8	9097	0.8481	0.9062	0.9173	3	27692
IDSIA-9	9287	0.8458	0.9088	0.9158	3.1	28518
IDSIA-10	9650	0.8548	0.9062	0.9237	3.1	29808
IDSIA-15	10936	0.8641	0.9148	0.93	3.1	34284
IDSIA-20	12574	0.8642	0.9178	0.9275	3.6	44888
RW-5	7843	0.6537	0.7566	0.7367	3	23529
RW-6	8341	0.6607	0.7664	0.7495	3	25023
RW-7	8643	0.6544	0.7606	0.7391	3	25929
RW-8	9097	0.6738	0.785	0.7647	3	27291
RW-9	9287	0.677	0.7899	0.7772	3	27861
RW-10	9650	0.6822	0.7933	0.7763	3	28950
RW-15	10936	0.6775	0.7881	0.7682	3	32808
RW-20	12574	0.7001	0.8166	0.7906	3	37722
MRJ-5	7843	0.6742	0.7795	0.7601	3	23529
MRJ-6	8341	0.6817	0.7891	0.7684	3	25023
MRJ-7	8643	0.6825	0.7896	0.7699	3	25929
MRJ-8	9097	0.6865	0.7948	0.7749	3	27291
MRJ-9	9287	0.6904	0.7997	0.7785	3	27861
MRJ-10	9650	0.692	0.8007	0.7817	3	28950
MRJ-15	10936	0.7004	0.8119	0.7914	3	32808
MRJ-20	12574	0.7157	0.8299	0.8096	3	37722

Table 10: Average results on sub-graph sampling for all tree-widths

Name	#EDGES	ACC	AUC	MAP	#ITERS	#UPDATES
PB-ORIG	16714	0.9534	0.9807	0.9798	4	66856
PB-IDSIA	4126	0.9391	0.9679	0.9662	3	12379
PB-RW	4126	0.7963	0.9185	0.9034	3	12379
PB-MRJ	4126	0.8133	0.9239	0.9094	3	12379
PM1-ORIG	44324	0.8803	0.9009	0.8386	3	132972
PM1-IDSIA	25166	0.8684	0.8961	0.8269	3	75498
PM1-RW	25166	0.7183	0.8078	0.6667	3	75497
PM1-MRJ	25166	0.7268	0.8127	0.6719	3	75497
PM2-ORIG	44324	0.8909	0.9404	0.9436	3.1	137897
PM2-IDSIA	25166	0.8776	0.9249	0.9259	3	75498
PM2-RW	25166	0.7494	0.8679	0.8477	3	75946
PM2-MRJ	25166	0.7508	0.8639	0.8437	3	75497
PM3-ORIG	44324	0.9223	0.9529	0.9687	3	132972
PM3-IDSIA	25166	0.9114	0.9418	0.9613	3	75498
PM3-RW	25166	0.7659	0.8683	0.9052	3	75497
PM3-MRJ	25166	0.756	0.8597	0.8969	3	75497
CP-ORIG	95397	0.8229	0.836	0.8845	8.3	794975
CP-IDSIA	9546	0.8506	0.9092	0.9205	3.1	30087
CP-RW	9546	0.6724	0.7821	0.7628	3	28639
CP-MRJ	9546	0.6904	0.7994	0.7793	3	28639