Supplementary Material for Chapter 6

Table 1: Comparison of the methods in dataset emotions in 5-fold cross-validation, using a treewidth bound of 2. For each fold and method, the conditional log-likelihood in the test dataset (CLL), the global accuracy (acc_G), the mean accuracy (acc_M), the learning time (time),the treewidth (tw) and the treewidth of the pruned graph (tw–pr) are shown. The optimal results are denoted in boldface.

Fold	Method	CLL	acc_G	acc_M	time	tw	tw-pr
1	DGS	-315.71	0.28	**0.791**	1.03	2	2
1	DGS-clp	**-300.3**	0.28	0.78	1.03	2	2
1	GS-tw	-449.6	0.27	0.78	**0.6**	2	2
1	GS-clp	-317.61	**0.294**	0.79	**0.6**	2	2
1	GS-pruned	-361.94	0.27	0.78	0.65	4	2
2	DGS	-317.76	0.24	0.76	0.79	2	2
2	DGS-clp	-309.24	0.24	0.76	0.79	2	2
2	GS-tw	-389.42	**0.345**	**0.794**	0.63	2	2
2	GS-clp	**-301.9**	0.32	0.79	0.63	2	2
2	GS-pruned	-336.51	0.28	0.76	**0.6**	3	2
3	DGS	-293.23	0.28	0.77	0.77	2	2
3	DGS-clp	**-285.3**	**0.319**	0.78	0.77	2	2
3	GS-tw	-355.2	0.29	**0.794**	0.61	2	2
3	GS-clp	-313.23	0.23	0.76	0.61	2	2
3	GS-pruned	-298.79	0.23	0.78	**0.6**	3	2
4	DGS	-317.8	**0.288**	0.77	0.74	2	2
4	DGS-clp	**-309.2**	**0.288**	0.77	0.74	2	2
4	GS-tw	-429.35	0.25	0.77	**0.6**	2	2
4	GS-clp	-349.22	0.27	**0.777**	**0.6**	2	2
4	GS-pruned	-352.53	0.28	0.76	0.65	3	2
5	DGS	-305.74	**0.322**	0.79	0.75	2	2
5	DGS-clp	**-298.4**	**0.322**	0.78	0.75	2	2
5	GS-tw	-477.82	0.28	0.78	**0.6**	2	2
5	GS-clp	-343.7	0.25	0.76	**0.6**	2	2
5	GS-pruned	-338.7	**0.322**	**0.797**	0.93	4	2

Table 2: Comparison of the methods in dataset emotions in 5-fold cross-validation, using a treewidth bound of 3. For each fold and method, the conditional log-likelihood in the test dataset (CLL), the global accuracy (acc_G), the mean accuracy (acc_M), the learning time (time),the treewidth (tw) and the treewidth of the pruned graph (tw–pr) are shown. The optimal results are denoted in boldface.

Fold	Method	CLL	acc_G	acc_M	time	tw	tw-pr
1	DGS	-300.92	0.29	0.79	1.16	3	3
1	DGS-clp	**-279.3**	**0.311**	0.78	1.16	3	3
1	GS-tw	-357.54	0.29	0.78	0.75	3	3
1	GS-clp	-295.83	0.29	**0.789**	0.75	3	3
1	GS-pruned	-348.87	0.28	0.78	**0.6**	4	3
2	DGS	-317.76	0.24	0.76	0.72	2	2
2	DGS-clp	-309.24	0.24	0.76	0.72	2	2
2	GS-tw	-326.83	0.27	0.75	0.75	3	3
2	GS-clp	**-299.5**	**0.277**	**0.768**	0.75	3	3
2	GS-pruned	-322.52	0.2	0.76	**0.6**	4	3
3	DGS	-293.23	0.28	0.77	0.71	2	2
3	DGS-clp	-285.34	**0.319**	0.78	0.71	2	2
3	GS-tw	-287.87	0.3	**0.8**	0.73	3	3
3	GS-clp	**-273.5**	0.3	0.79	0.73	3	3
3	GS-pruned	-292.9	0.28	0.8	**0.6**	4	3
4	DGS	-317.8	0.29	0.77	0.71	2	2
4	DGS-clp	**-309.2**	0.29	0.77	0.71	2	2
4	GS-tw	-355.62	0.29	0.78	0.69	3	3
4	GS-clp	-313.92	**0.314**	**0.798**	0.69	3	3
4	GS-pruned	-347.44	0.3	0.79	**0.6**	4	3
5	DGS	-302.83	0.31	0.79	0.88	3	3
5	DGS-clp	**-295.5**	**0.322**	0.78	0.88	3	3
5	GS-tw	-348.01	0.31	0.79	0.72	3	3
5	GS-clp	-311.3	0.28	0.77	0.72	3	3
5	GS-pruned	-333.77	0.31	**0.802**	**0.7**	4	3

Table 3: Comparison of the methods in dataset emotions in 5-fold cross-validation, using a treewidth bound of 4. For each fold and method, the conditional log-likelihood in the test dataset (CLL), the global accuracy (acc_G), the mean accuracy (acc_M), the learning time (time),the treewidth (tw) and the treewidth of the pruned graph (tw–pr) are shown. The optimal results are denoted in boldface.

Fold	Method	CLL	acc_G	acc_M	time	tw	tw-pr
1	DGS	-300.92	0.29	**0.787**	0.77	3	3
1	DGS-clp	**-279.3**	**0.311**	0.78	0.77	3	3
1	GS-tw	-348.87	0.28	0.78	0.74	3	3
1	GS-clp	-286.26	0.28	0.79	0.74	3	3
1	GS-pruned	-348.87	0.28	0.78	**0.6**	4	3
2	DGS	-317.76	**0.244**	0.76	0.76	2	2
2	DGS-clp	-309.24	**0.244**	**0.763**	0.76	2	2
2	GS-tw	-322.52	0.2	0.76	0.78	4	3
2	GS-clp	**-305.3**	0.22	0.75	0.78	4	3
2	GS-pruned	-322.52	0.2	0.76	**0.6**	4	3
3	DGS	-293.23	0.28	0.77	0.81	2	2
3	DGS-clp	-285.34	**0.319**	0.78	0.81	2	2
3	GS-tw	-286.04	0.29	**0.801**	0.8	4	3
3	GS-clp	**-272.4**	**0.319**	0.78	0.8	4	3
3	GS-pruned	-292.9	0.28	0.8	**0.6**	4	3
4	DGS	-317.8	0.29	0.77	0.75	2	2
4	DGS-clp	-309.18	0.29	0.77	0.75	2	2
4	GS-tw	-348.21	**0.314**	0.78	0.75	3	3
4	GS-clp	**-304.7**	0.31	**0.794**	0.75	3	3
4	GS-pruned	-347.44	0.3	0.79	**0.6**	4	3
5	DGS	-302.83	0.31	0.79	0.78	3	3
5	DGS-clp	**-295.5**	**0.322**	0.78	0.78	3	3
5	GS-tw	-334.73	0.31	0.79	0.77	4	3
5	GS-clp	-309.08	0.31	0.78	0.77	4	3
5	GS-pruned	-333.77	0.31	**0.802**	**0.7**	4	3

Table 4: Comparison of the methods in dataset emotions in 5-fold cross-validation, using a treewidth bound of 5. For each fold and method, the conditional log-likelihood in the test dataset (CLL), the global accuracy (acc_G), the mean accuracy (acc_M), the learning time (time),the treewidth (tw) and the treewidth of the pruned graph (tw–pr) are shown. The optimal results are denoted in boldface.

Fold	Method	CLL	acc_G	acc_M	time	tw	tw-pr
1	DGS	-300.92	0.29	**0.787**	0.76	3	3
1	DGS-clp	**-279.3**	**0.311**	0.78	0.76	3	3
1	GS-tw	-348.87	0.28	0.78	0.79	3	3
1	GS-clp	-286.26	0.28	0.79	0.79	3	3
1	GS-pruned	-348.87	0.28	0.78	**0.7**	4	3
2	DGS	-317.76	**0.244**	0.76	0.74	2	2
2	DGS-clp	-309.24	**0.244**	**0.763**	0.74	2	2
2	GS-tw	-322.52	0.2	0.76	0.76	4	3
2	GS-clp	**-305.3**	0.22	0.75	0.76	4	3
2	GS-pruned	-322.52	0.2	0.76	**0.7**	4	3
3	DGS	-293.23	0.28	0.77	0.74	2	2
3	DGS-clp	-285.34	**0.319**	0.78	0.74	2	2
3	GS-tw	-292.9	0.28	**0.796**	0.76	4	3
3	GS-clp	**-274.1**	0.29	0.77	0.76	4	3
3	GS-pruned	-292.9	0.28	**0.796**	**0.7**	4	3
4	DGS	-317.8	0.29	0.77	0.72	2	2
4	DGS-clp	-309.18	0.29	0.77	0.72	2	2
4	GS-tw	-347.44	**0.297**	0.79	0.84	4	3
4	GS-clp	**-302.8**	**0.297**	**0.794**	0.84	4	3
4	GS-pruned	-347.44	**0.297**	0.79	**0.6**	4	3
5	DGS	-302.83	0.31	0.79	0.75	3	3
5	DGS-clp	**-295.5**	**0.322**	0.78	0.75	3	3
5	GS-tw	-333.77	0.31	**0.802**	0.81	4	3
5	GS-clp	-309.21	0.29	0.79	0.81	4	3
5	GS-pruned	-333.77	0.31	**0.802**	**0.7**	4	3

Table 5: Comparison of the methods in dataset foodtruck in 5-fold cross-validation, using a treewidth bound of 2. For each fold and method, the conditional log-likelihood in the test dataset (CLL), the global accuracy (acc_G), the mean accuracy (acc_M), the learning time (time),the treewidth (tw) and the treewidth of the pruned graph (tw–pr) are shown. The optimal results are denoted in boldface.

Fold	Method	CLL	acc_G	acc_M	time	tw	tw-pr
1	DGS	-342.28	**0.317**	**0.852**	0.23	2	2
1	DGS-clp	-342.34	**0.317**	**0.852**	0.23	2	2
1	GS-tw	-341.1	0.29	0.85	0.06	2	2
1	GS-clp	**-339.6**	**0.317**	0.84	0.06	2	2
1	GS-pruned	-341.1	0.29	0.85	**0**	2	2
2	DGS	-363.21	**0.244**	0.84	0.13	2	2
2	DGS-clp	-364.11	**0.244**	0.84	0.13	2	2
2	GS-tw	-366.04	**0.244**	0.84	0.05	2	2
2	GS-clp	**-360.3**	0.23	**0.845**	0.05	2	2
2	GS-pruned	-366.04	**0.244**	0.84	**0**	2	2
3	DGS	**-358**	**0.185**	0.84	0.12	2	2
3	DGS-clp	-358.5	**0.185**	0.84	0.12	2	2
3	GS-tw	-359.46	0.17	**0.845**	**0**	2	2
3	GS-clp	-361.47	**0.185**	0.84	**0**	2	2
3	GS-pruned	-359.46	0.17	**0.845**	0.07	2	2
4	DGS	**-361.4**	**0.296**	0.87	0.13	2	2
4	DGS-clp	-362.6	**0.296**	**0.866**	0.13	2	2
4	GS-tw	-365.01	0.28	0.85	**0.1**	2	2
4	GS-clp	-363.35	0.28	0.85	**0.1**	2	2
4	GS-pruned	-365.01	0.28	0.85	0.06	2	2
5	DGS	**-399.9**	**0.259**	**0.819**	0.12	2	2
5	DGS-clp	-400.81	**0.259**	**0.819**	0.12	2	2
5	GS-tw	-405.2	0.21	0.82	**0.1**	2	2
5	GS-clp	-400.49	0.25	**0.819**	**0.1**	2	2
5	GS-pruned	-405.2	0.21	0.82	0.06	2	2

Table 6: Comparison of the methods in dataset foodtruck in 5-fold cross-validation, using a treewidth bound of 3. For each fold and method, the conditional log-likelihood in the test dataset (CLL), the global accuracy (acc_G), the mean accuracy (acc_M), the learning time (time),the treewidth (tw) and the treewidth of the pruned graph (tw–pr) are shown. The optimal results are denoted in boldface.

Fold	Method	CLL	acc_G	acc_M	time	tw	tw-pr
1	DGS	-342.28	**0.317**	**0.852**	0.12	2	2
1	DGS-clp	-342.34	**0.317**	**0.852**	0.12	2	2
1	GS-tw	-341.1	0.29	0.85	0.06	2	2
1	GS-clp	**-339.6**	**0.317**	0.84	0.06	2	2
1	GS-pruned	-341.1	0.29	0.85	**0**	2	2
2	DGS	-363.21	**0.244**	0.84	0.12	2	2
2	DGS-clp	-364.11	**0.244**	0.84	0.12	2	2
2	GS-tw	-366.04	**0.244**	0.84	**0**	2	2
2	GS-clp	**-360.3**	0.23	**0.845**	**0**	2	2
2	GS-pruned	-366.04	**0.244**	0.84	0.06	2	2
3	DGS	**-358**	**0.185**	0.84	0.12	2	2
3	DGS-clp	-358.5	**0.185**	0.84	0.12	2	2
3	GS-tw	-359.46	0.17	**0.845**	0.05	2	2
3	GS-clp	-361.47	**0.185**	0.84	0.05	2	2
3	GS-pruned	-359.46	0.17	**0.845**	**0.1**	2	2
4	DGS	**-360.4**	**0.296**	0.87	0.13	3	3
4	DGS-clp	-361.78	**0.296**	**0.866**	0.13	3	3
4	GS-tw	-364.03	0.28	0.85	0.06	3	3
4	GS-clp	-362.48	0.28	0.85	0.06	3	3
4	GS-pruned	-364.03	0.28	0.85	**0.1**	3	3
5	DGS	**-399.9**	**0.259**	**0.819**	0.12	2	2
5	DGS-clp	-400.81	**0.259**	**0.819**	0.12	2	2
5	GS-tw	-405.2	0.21	0.82	**0.1**	2	2
5	GS-clp	-400.49	0.25	**0.819**	**0.1**	2	2
5	GS-pruned	-405.2	0.21	0.82	0.06	2	2

Table 7: Comparison of the methods in dataset foodtruck in 5-fold cross-validation, using a treewidth bound of 4. For each fold and method, the conditional log-likelihood in the test dataset (CLL), the global accuracy (acc_G), the mean accuracy (acc_M), the learning time (time),the treewidth (tw) and the treewidth of the pruned graph (tw–pr) are shown. The optimal results are denoted in boldface.

Fold	Method	CLL	acc_G	acc_M	time	tw	tw-pr
1	DGS	-342.28	**0.317**	**0.852**	0.12	2	2
1	DGS-clp	-342.34	**0.317**	**0.852**	0.12	2	2
1	GS-tw	-341.1	0.29	0.85	0.05	2	2
1	GS-clp	**-339.6**	**0.317**	0.84	0.05	2	2
1	GS-pruned	-341.1	0.29	0.85	**0**	2	2
2	DGS	-363.21	**0.244**	0.84	0.11	2	2
2	DGS-clp	-364.11	**0.244**	0.84	0.11	2	2
2	GS-tw	-366.04	**0.244**	0.84	**0**	2	2
2	GS-clp	**-360.3**	0.23	**0.845**	**0**	2	2
2	GS-pruned	-366.04	**0.244**	0.84	0.05	2	2
3	DGS	**-358**	**0.185**	0.84	0.13	2	2
3	DGS-clp	-358.5	**0.185**	0.84	0.13	2	2
3	GS-tw	-359.46	0.17	**0.845**	**0**	2	2
3	GS-clp	-361.47	**0.185**	0.84	**0**	2	2
3	GS-pruned	-359.46	0.17	**0.845**	0.06	2	2
4	DGS	**-360.4**	**0.296**	0.87	0.13	3	3
4	DGS-clp	-361.78	**0.296**	**0.866**	0.13	3	3
4	GS-tw	-364.03	0.28	0.85	**0.1**	3	3
4	GS-clp	-362.48	0.28	0.85	**0.1**	3	3
4	GS-pruned	-364.03	0.28	0.85	0.07	3	3
5	DGS	**-399.9**	**0.259**	**0.819**	0.12	2	2
5	DGS-clp	-400.81	**0.259**	**0.819**	0.12	2	2
5	GS-tw	-405.2	0.21	0.82	0.07	2	2
5	GS-clp	-400.49	0.25	**0.819**	0.07	2	2
5	GS-pruned	-405.2	0.21	0.82	**0.1**	2	2

Table 8: Comparison of the methods in dataset foodtruck in 5-fold cross-validation, using a treewidth bound of 5. For each fold and method, the conditional log-likelihood in the test dataset (CLL), the global accuracy (acc_G), the mean accuracy (acc_M), the learning time (time),the treewidth (tw) and the treewidth of the pruned graph (tw–pr) are shown. The optimal results are denoted in boldface.

Fold	Method	CLL	acc_G	acc_M	time	tw	tw-pr
1	DGS	-342.28	**0.317**	**0.852**	0.13	2	2
1	DGS-clp	-342.34	**0.317**	**0.852**	0.13	2	2
1	GS-tw	-341.1	0.29	0.85	0.06	2	2
1	GS-clp	**-339.6**	**0.317**	0.84	0.06	2	2
1	GS-pruned	-341.1	0.29	0.85	**0**	2	2
2	DGS	-363.21	**0.244**	0.84	0.12	2	2
2	DGS-clp	-364.11	**0.244**	0.84	0.12	2	2
2	GS-tw	-366.04	**0.244**	0.84	**0**	2	2
2	GS-clp	**-360.3**	0.23	**0.845**	**0**	2	2
2	GS-pruned	-366.04	**0.244**	0.84	0.05	2	2
3	DGS	**-358**	**0.185**	0.84	0.16	2	2
3	DGS-clp	-358.5	**0.185**	0.84	0.16	2	2
3	GS-tw	-359.46	0.17	**0.845**	**0**	2	2
3	GS-clp	-361.47	**0.185**	0.84	**0**	2	2
3	GS-pruned	-359.46	0.17	**0.845**	0.05	2	2
4	DGS	**-360.4**	**0.296**	0.87	0.12	3	3
4	DGS-clp	-361.78	**0.296**	**0.866**	0.12	3	3
4	GS-tw	-364.03	0.28	0.85	**0.1**	3	3
4	GS-clp	-362.48	0.28	0.85	**0.1**	3	3
4	GS-pruned	-364.03	0.28	0.85	0.08	3	3
5	DGS	**-399.9**	**0.259**	**0.819**	0.13	2	2
5	DGS-clp	-400.81	**0.259**	**0.819**	0.13	2	2
5	GS-tw	-405.2	0.21	0.82	0.06	2	2
5	GS-clp	-400.49	0.25	**0.819**	0.06	2	2
5	GS-pruned	-405.2	0.21	0.82	**0.1**	2	2

Table 9: Comparison of the methods in dataset birds in 5-fold cross-validation, using a treewidth bound of 2. For each fold and method, the conditional log-likelihood in the test dataset (CLL), the global accuracy (acc_G), the mean accuracy (acc_M), the learning time (time),the treewidth (tw) and the treewidth of the pruned graph (tw–pr) are shown. The optimal results are denoted in boldface.

Fold	Method	CLL	acc_G	acc_M	time	tw	tw-pr
1	DGS	-464.69	0.39	0.94	**4.3**	1	1
1	DGS-clp	**-463.2**	0.4	0.93	**4.3**	1	1
1	GS-tw	-764.85	0.39	0.93	8.02	2	2
1	GS-clp	-473.46	**0.419**	**0.939**	8.02	2	2
1	GS-pruned	-483.23	0.4	0.94	6.2	3	2
2	DGS	-432.34	0.47	0.95	**4.8**	1	1
2	DGS-clp	**-426.3**	0.43	0.95	**4.8**	1	1
2	GS-tw	-683.37	0.46	0.94	7.23	2	2
2	GS-clp	-439.78	**0.481**	**0.951**	7.23	2	2
2	GS-pruned	-451.61	0.42	0.95	6.39	3	1
3	DGS	**-414.8**	**0.45**	**0.944**	**4.9**	1	1
3	DGS-clp	-415.49	0.43	0.94	**4.9**	1	1
3	GS-tw	-629.66	0.44	0.93	7.12	2	2
3	GS-clp	-427.4	**0.45**	0.94	7.12	2	2
3	GS-pruned	-456.72	0.4	0.94	6.67	3	2
4	DGS	-364.14	0.55	**0.959**	**4.4**	2	1
4	DGS-clp	**-359.2**	0.55	0.96	**4.4**	2	1
4	GS-tw	-657.38	0.51	0.94	6.64	2	2
4	GS-clp	-381.86	**0.558**	**0.959**	6.64	2	2
4	GS-pruned	-396.29	0.53	0.96	6.28	3	2
5	DGS	**-371.8**	0.52	0.95	**4.4**	1	1
5	DGS-clp	-373.13	0.52	0.96	**4.4**	1	1
5	GS-tw	-615.19	0.45	0.93	6.8	2	2
5	GS-clp	-385.61	**0.55**	**0.956**	6.8	2	2
5	GS-pruned	-394.88	0.49	0.95	6.32	3	2

Table 10: Comparison of the methods in dataset birds in 5-fold cross-validation, using a treewidth bound of 3. For each fold and method, the conditional log-likelihood in the test dataset (CLL), the global accuracy (acc_G), the mean accuracy (acc_M), the learning time (time),the treewidth (tw) and the treewidth of the pruned graph (tw–pr) are shown. The optimal results are denoted in boldface.

Fold	Method	CLL	acc_G	acc_M	time	tw	tw-pr
1	DGS	-464.69	0.39	0.94	**4.3**	1	1
1	DGS-clp	**-463.2**	**0.403**	0.93	**4.3**	1	1
1	GS-tw	-493.39	0.36	0.94	7.81	3	3
1	GS-clp	-463.37	**0.403**	**0.938**	7.81	3	3
1	GS-pruned	-472.5	0.4	0.94	6.5	3	3
2	DGS	-432.34	0.47	0.95	**4.9**	1	1
2	DGS-clp	**-426.3**	0.43	0.95	**4.9**	1	1
2	GS-tw	-473.13	**0.481**	0.94	7.82	3	2
2	GS-clp	-440.55	0.44	**0.948**	7.82	3	2
2	GS-pruned	-447.78	0.44	0.95	8.09	3	3
3	DGS	**-414.8**	0.45	0.94	**5.7**	1	1
3	DGS-clp	-415.49	0.43	0.94	**5.7**	1	1
3	GS-tw	-433.59	**0.473**	0.94	8.36	3	2
3	GS-clp	-419.36	0.44	**0.947**	8.36	3	2
3	GS-pruned	-434.36	0.44	0.94	7.69	3	2
4	DGS	-364.14	0.55	**0.959**	**5.6**	2	1
4	DGS-clp	**-359.2**	0.55	0.96	**5.6**	2	1
4	GS-tw	-422.26	0.52	0.95	9.38	3	2
4	GS-clp	-377.26	**0.558**	0.96	9.38	3	2
4	GS-pruned	-393.49	0.52	0.96	6.83	4	2
5	DGS	**-371.8**	0.52	0.95	**4.4**	1	1
5	DGS-clp	-373.13	0.52	**0.955**	**4.4**	1	1
5	GS-tw	-426.54	**0.535**	0.95	7.84	3	2
5	GS-clp	-395.78	0.53	0.95	7.84	3	2
5	GS-pruned	-400.2	0.52	0.95	6.49	4	2

Table 11: Comparison of the methods in dataset birds in 5-fold cross-validation, using a treewidth bound of 4. For each fold and method, the conditional log-likelihood in the test dataset (CLL), the global accuracy (acc_G), the mean accuracy (acc_M), the learning time (time),the treewidth (tw) and the treewidth of the pruned graph (tw–pr) are shown. The optimal results are denoted in boldface.

Fold	Method	CLL	acc_G	acc_M	time	tw	tw-pr
1	DGS	-464.69	0.39	0.94	**4.4**	1	1
1	DGS-clp	**-463.2**	**0.403**	0.93	**4.4**	1	1
1	GS-tw	-472.5	0.4	0.94	7.46	3	2
1	GS-clp	-468	**0.403**	**0.94**	7.46	3	2
1	GS-pruned	-472.5	0.4	0.94	7.11	3	3
2	DGS	-432.34	**0.473**	**0.948**	**4.8**	1	1
2	DGS-clp	**-426.3**	0.43	**0.948**	**4.8**	1	1
2	GS-tw	-443.88	0.44	0.95	7.65	3	2
2	GS-clp	-440.34	0.43	0.95	7.65	3	2
2	GS-pruned	-447.78	0.44	0.95	7.04	3	3
3	DGS	**-414.8**	**0.45**	0.94	**5.6**	1	1
3	DGS-clp	-415.49	0.43	0.94	**5.6**	1	1
3	GS-tw	-434.81	0.43	0.94	7.64	4	2
3	GS-clp	-432.79	0.43	0.94	7.64	4	2
3	GS-pruned	-434.36	0.44	**0.945**	6.36	3	2
4	DGS	-364.14	0.55	**0.959**	**4.7**	2	1
4	DGS-clp	**-359.2**	0.55	0.96	**4.7**	2	1
4	GS-tw	-393.49	0.52	0.96	7.55	4	2
4	GS-clp	-371.88	**0.566**	0.96	7.55	4	2
4	GS-pruned	-393.49	0.52	0.96	7.18	4	2
5	DGS	**-371.8**	**0.519**	0.95	**4.5**	1	1
5	DGS-clp	-373.13	**0.519**	**0.955**	**4.5**	1	1
5	GS-tw	-400.2	**0.519**	0.95	8.54	4	2
5	GS-clp	-396.89	0.51	0.95	8.54	4	2
5	GS-pruned	-400.2	**0.519**	0.95	6.5	4	2

Table 12: Comparison of the methods in dataset birds in 5-fold cross-validation, using a treewidth bound of 5. For each fold and method, the conditional log-likelihood in the test dataset (CLL), the global accuracy (acc_G), the mean accuracy (acc_M), the learning time (time),the treewidth (tw) and the treewidth of the pruned graph (tw–pr) are shown. The optimal results are denoted in boldface.

Fold	Method	CLL	acc_G	acc_M	time	tw	tw-pr
1	DGS	-464.69	0.39	0.94	**4.3**	1	1
1	DGS-clp	**-463.2**	**0.403**	0.93	**4.3**	1	1
1	GS-tw	-472.5	0.4	0.94	7.47	3	2
1	GS-clp	-468	**0.403**	**0.94**	7.47	3	2
1	GS-pruned	-472.5	0.4	0.94	6.73	3	3
2	DGS	-432.34	**0.473**	**0.948**	**4.7**	1	1
2	DGS-clp	**-426.3**	0.43	**0.948**	**4.7**	1	1
2	GS-tw	-447.78	0.44	0.95	7.78	3	2
2	GS-clp	-444.87	0.43	0.95	7.78	3	2
2	GS-pruned	-447.78	0.44	0.95	6.53	3	3
3	DGS	**-414.8**	**0.45**	0.94	**5.5**	1	1
3	DGS-clp	-415.49	0.43	0.94	**5.5**	1	1
3	GS-tw	-434.36	0.44	**0.945**	7.89	4	2
3	GS-clp	-434.4	0.42	0.94	7.89	4	2
3	GS-pruned	-434.36	0.44	**0.945**	6.81	3	2
4	DGS	-364.14	0.55	**0.959**	**4.5**	2	1
4	DGS-clp	**-359.2**	0.55	0.96	**4.5**	2	1
4	GS-tw	-393.49	0.52	0.96	7.7	4	2
4	GS-clp	-371.88	**0.566**	0.96	7.7	4	2
4	GS-pruned	-393.49	0.52	0.96	6.26	4	2
5	DGS	**-371.8**	**0.519**	0.95	**4.5**	1	1
5	DGS-clp	-373.13	**0.519**	**0.955**	**4.5**	1	1
5	GS-tw	-400.2	**0.519**	0.95	8.84	4	2
5	GS-clp	-396.89	0.51	0.95	8.84	4	2
5	GS-pruned	-400.2	**0.519**	0.95	6.58	4	2

Table 13: Comparison of the methods in dataset scene in 5-fold cross-validation, using a treewidth bound of 2. For each fold and method, the conditional log-likelihood in the test dataset (CLL), the global accuracy (acc_G), the mean accuracy (acc_M), the learning time (time),the treewidth (tw) and the treewidth of the pruned graph (tw–pr) are shown. The optimal results are denoted in boldface.

Fold	Method	CLL	acc_G	acc_M	time	tw	tw-pr
1	DGS	-674.62	**0.6**	**0.897**	16.15	2	2
1	DGS-clp	**-643.3**	0.59	0.9	16.15	2	2
1	GS-tw	-3190.74	0.51	0.86	**11.8**	2	2
1	GS-clp	-1326.52	0.53	0.88	**11.8**	2	2
1	GS-pruned	-799.89	0.43	0.88	24.99	20	2
2	DGS	-813.7	0.53	0.88	17.53	2	2
2	DGS-clp	**-719.5**	**0.558**	**0.889**	17.53	2	2
2	GS-tw	-2629.79	0.48	0.86	**11.8**	2	2
2	GS-clp	-1242.91	0.5	0.86	**11.8**	2	2
2	GS-pruned	-882.71	0.45	0.86	21.39	17	2
3	DGS	-643.25	**0.613**	0.9	20.16	2	2
3	DGS-clp	**-615.2**	0.6	**0.899**	20.16	2	2
3	GS-tw	-3140.02	0.42	0.85	**12.2**	2	2
3	GS-clp	-1328.36	0.48	0.87	**12.2**	2	2
3	GS-pruned	-866.79	0.45	0.86	25.96	13	2
4	DGS	-686.13	0.61	0.89	19.57	2	2
4	DGS-clp	**-641.5**	**0.628**	**0.897**	19.57	2	2
4	GS-tw	-4030.28	0.41	0.84	**12.4**	2	2
4	GS-clp	-1161.97	0.51	0.87	**12.4**	2	2
4	GS-pruned	-815.36	0.47	0.87	22.82	16	2
5	DGS	-660.32	0.57	0.89	19.08	2	2
5	DGS-clp	**-634**	**0.599**	**0.897**	19.08	2	2
5	GS-tw	-3049.73	0.48	0.86	**12.4**	2	2
5	GS-clp	-1075.31	0.56	0.88	**12.4**	2	2
5	GS-pruned	-800.85	0.41	0.87	27.73	20	2

Table 14: Comparison of the methods in dataset scene in 5-fold cross-validation, using a treewidth bound of 3. For each fold and method, the conditional log-likelihood in the test dataset (CLL), the global accuracy (acc_G), the mean accuracy (acc_M), the learning time (time),the treewidth (tw) and the treewidth of the pruned graph (tw–pr) are shown. The optimal results are denoted in boldface.

Fold	Method	CLL	acc_G	acc_M	time	tw	tw-pr
1	DGS	-618.2	0.61	**0.899**	**17.7**	3	3
1	DGS-clp	**-594**	**0.616**	0.9	**17.7**	3	3
1	GS-tw	-1558.1	0.51	0.88	23.86	3	3
1	GS-clp	-737.24	0.55	0.88	23.86	3	3
1	GS-pruned	-733.82	0.49	0.88	22.92	21	3
2	DGS	-813.7	0.53	0.88	**18.7**	2	2
2	DGS-clp	**-719.5**	**0.558**	**0.889**	**18.7**	2	2
2	GS-tw	-1356.8	0.51	0.87	24.01	3	3
2	GS-clp	-801.73	0.55	0.88	24.01	3	3
2	GS-pruned	-842.93	0.45	0.86	27.15	17	3
3	DGS	-631.4	**0.626**	**0.901**	**18.1**	3	3
3	DGS-clp	**-605.8**	0.62	0.9	**18.1**	3	3
3	GS-tw	-1562.19	0.49	0.87	22.82	3	3
3	GS-clp	-758.8	0.52	0.88	22.82	3	3
3	GS-pruned	-773.21	0.49	0.87	25.7	22	3
4	DGS	-655.5	**0.632**	**0.899**	**18.5**	3	3
4	DGS-clp	**-623.5**	0.62	0.9	**18.5**	3	3
4	GS-tw	-1395.93	0.5	0.87	24.01	3	3
4	GS-clp	-758.86	0.55	0.88	24.01	3	3
4	GS-pruned	-726.98	0.54	0.88	22.93	15	3
5	DGS	-648.42	**0.599**	**0.894**	**17.4**	3	3
5	DGS-clp	**-630.7**	0.57	0.89	**17.4**	3	3
5	GS-tw	-1285.26	0.51	0.86	24.05	3	3
5	GS-clp	-738.85	0.53	0.87	24.05	3	3
5	GS-pruned	-750.37	0.46	0.86	23.8	21	3

Table 15: Comparison of the methods in dataset scene in 5-fold cross-validation, using a treewidth bound of 4. For each fold and method, the conditional log-likelihood in the test dataset (CLL), the global accuracy (acc_G), the mean accuracy (acc_M), the learning time (time),the treewidth (tw) and the treewidth of the pruned graph (tw–pr) are shown. The optimal results are denoted in boldface.

Fold	Method	CLL	acc_G	acc_M	time	tw	tw-pr
1	DGS	-625.01	**0.612**	**0.893**	**17.9**	4	4
1	DGS-clp	**-590.7**	**0.612**	0.89	**17.9**	4	4
1	GS-tw	-663.62	0.58	0.88	27.42	4	4
1	GS-clp	-656.09	0.55	0.88	27.42	4	4
1	GS-pruned	-678.54	0.53	0.88	24.42	20	4
2	DGS	-813.7	0.53	0.88	**18.4**	2	2
2	DGS-clp	-719.45	**0.558**	**0.889**	**18.4**	2	2
2	GS-tw	-756.76	0.51	0.86	26.66	4	4
2	GS-clp	**-699.3**	0.54	0.87	26.66	4	4
2	GS-pruned	-762.25	0.46	0.85	29.05	18	4
3	DGS	-631.4	**0.626**	**0.901**	**17.8**	3	3
3	DGS-clp	**-605.8**	0.62	0.9	**17.8**	3	3
3	GS-tw	-730.73	0.53	0.87	27.49	4	4
3	GS-clp	-678.2	0.55	0.88	27.49	4	4
3	GS-pruned	-703.37	0.55	0.87	24.96	17	4
4	DGS	-670.22	0.61	0.89	25.37	4	4
4	DGS-clp	**-604**	**0.626**	**0.896**	25.37	4	4
4	GS-tw	-667.99	0.58	0.88	25.65	4	4
4	GS-clp	-643.28	0.54	0.88	25.65	4	4
4	GS-pruned	-705.44	0.51	0.87	**23.3**	16	4
5	DGS	-574.27	**0.653**	0.9	**18.3**	4	4
5	DGS-clp	**-548**	0.64	**0.904**	**18.3**	4	4
5	GS-tw	-690.44	0.56	0.87	26.56	4	4
5	GS-clp	-669.79	0.54	0.87	26.56	4	4
5	GS-pruned	-708.94	0.57	0.87	26.72	22	4

Table 16: Comparison of the methods in dataset scene in 5-fold cross-validation, using a treewidth bound of 5. For each fold and method, the conditional log-likelihood in the test dataset (CLL), the global accuracy (acc_G), the mean accuracy (acc_M), the learning time (time),the treewidth (tw) and the treewidth of the pruned graph (tw–pr) are shown. The optimal results are denoted in boldface.

Fold	Method	CLL	acc_G	acc_M	time	tw	tw-pr
1	DGS	-625.01	0.61	**0.893**	**18.6**	4	4
1	DGS-clp	-590.68	0.61	0.89	**18.6**	4	4
1	GS-tw	**-566.4**	**0.639**	0.89	39.26	5	5
1	GS-clp	-581.01	0.61	0.88	39.26	5	5
1	GS-pruned	-590.17	0.62	0.88	25.07	20	5
2	DGS	-813.7	0.53	0.88	**19.9**	2	2
2	DGS-clp	-719.45	0.56	**0.889**	**19.9**	2	2
2	GS-tw	-645.7	0.58	0.87	29.56	5	5
2	GS-clp	**-616.1**	**0.604**	0.88	29.56	5	5
2	GS-pruned	-681.04	0.57	0.87	25.49	16	5
3	DGS	-631.4	**0.626**	**0.901**	**20.1**	3	3
3	DGS-clp	**-605.8**	0.62	0.9	**20.1**	3	3
3	GS-tw	-659.28	0.6	0.88	28.57	5	5
3	GS-clp	-665.85	0.58	0.87	28.57	5	5
3	GS-pruned	-670.17	0.58	0.87	25.43	18	5
4	DGS	-608.46	0.66	0.9	**18.8**	5	5
4	DGS-clp	**-527.1**	**0.672**	**0.898**	**18.8**	5	5
4	GS-tw	-587.14	0.63	0.89	32.9	5	5
4	GS-clp	-577.97	0.62	0.89	32.9	5	5
4	GS-pruned	-634.36	0.57	0.87	25.62	14	5
5	DGS	-574.27	**0.653**	0.9	**18.8**	4	4
5	DGS-clp	**-548**	0.64	**0.904**	**18.8**	4	4
5	GS-tw	-602.4	0.58	0.88	29.17	5	5
5	GS-clp	-591.39	0.58	0.88	29.17	5	5
5	GS-pruned	-623.14	0.58	0.87	27.33	22	5

Table 17: Comparison of the methods in dataset genbase in 5-fold cross-validation, using a treewidth bound of 2. For each fold and method, the conditional log-likelihood in the test dataset (CLL), the global accuracy (acc_G), the mean accuracy (acc_M), the learning time (time),the treewidth (tw) and the treewidth of the pruned graph (tw–pr) are shown. The optimal results are denoted in boldface.

Fold	Method	CLL	acc_G	acc_M	time	tw	tw-pr
1	DGS	-14.28	**0.985**	**0.999**	19.73	1	1
1	DGS-clp	**-3.8**	**0.985**	**0.999**	19.73	1	1
1	GS-tw	-19.79	**0.985**	1	**17.5**	2	2
1	GS-clp	-8.36	**0.985**	1	**17.5**	2	2
1	GS-pruned	-20.18	**0.985**	1	17.8	4	2
2	DGS	-31.35	**0.97**	1	19.58	1	1
2	DGS-clp	-42.69	**0.97**	1	19.58	1	1
2	GS-tw	-21.69	**0.97**	**0.999**	**17.8**	2	2
2	GS-clp	-35.97	**0.97**	1	**17.8**	2	2
2	GS-pruned	**-21.7**	**0.97**	**0.999**	18.28	4	2
3	DGS	-61.44	**0.962**	1	17.69	1	1
3	DGS-clp	-90.64	**0.962**	1	17.69	1	1
3	GS-tw	**-49.9**	0.95	1	**17.1**	2	2
3	GS-clp	-80.94	**0.962**	**0.998**	**17.1**	2	2
3	GS-pruned	-50.25	0.95	1	17.43	5	2
4	DGS	-24.61	**0.962**	**0.999**	18.6	2	1
4	DGS-clp	-25.92	**0.962**	**0.999**	18.6	2	1
4	GS-tw	**-19.5**	**0.962**	**0.999**	**16.7**	2	2
4	GS-clp	-31.44	**0.962**	**0.999**	**16.7**	2	2
4	GS-pruned	-20.1	**0.962**	**0.999**	17.05	5	2
5	DGS	-17.49	**0.985**	1	19.6	1	1
5	DGS-clp	-21.59	**0.985**	1	19.6	1	1
5	GS-tw	-12.11	**0.985**	1	**17.2**	2	2
5	GS-clp	**-12.1**	**0.985**	1	**17.2**	2	2
5	GS-pruned	-12.15	**0.985**	**1**	18.04	4	2

Table 18: Comparison of the methods in dataset genbase in 5-fold cross-validation, using a treewidth bound of 3. For each fold and method, the conditional log-likelihood in the test dataset (CLL), the global accuracy (acc_G), the mean accuracy (acc_M), the learning time (time),the treewidth (tw) and the treewidth of the pruned graph (tw–pr) are shown. The optimal results are denoted in boldface.

Fold	Method	CLL	acc_G	acc_M	time	tw	tw-pr
1	DGS	-14.28	**0.985**	**0.999**	19.76	1	1
1	DGS-clp	**-3.8**	**0.985**	**0.999**	19.76	1	1
1	GS-tw	-19.79	**0.985**	1	18.87	3	3
1	GS-clp	-9.88	**0.985**	1	18.87	3	3
1	GS-pruned	-19.79	**0.985**	1	**18.4**	3	3
2	DGS	-31.35	**0.97**	1	19.66	1	1
2	DGS-clp	-42.69	**0.97**	1	19.66	1	1
2	GS-tw	**-23.2**	**0.97**	**0.999**	20.86	3	3
2	GS-clp	-31.62	**0.97**	1	20.86	3	3
2	GS-pruned	-23.25	**0.97**	**0.999**	**18.6**	4	3
3	DGS	-61.44	**0.962**	1	18.25	1	1
3	DGS-clp	-90.64	**0.962**	1	18.25	1	1
3	GS-tw	**-50.2**	0.95	1	18.3	3	3
3	GS-clp	-71.64	**0.962**	**0.998**	18.3	3	3
3	GS-pruned	-50.21	0.95	1	**18.1**	5	3
4	DGS	-24.61	**0.962**	**0.999**	18.74	2	1
4	DGS-clp	-25.92	**0.962**	**0.999**	18.74	2	1
4	GS-tw	-20.04	**0.962**	**0.999**	**17.5**	3	3
4	GS-clp	-33.68	**0.962**	**0.999**	**17.5**	3	3
4	GS-pruned	**-20**	**0.962**	**0.999**	17.59	4	3
5	DGS	-17.49	**0.985**	1	19.98	1	1
5	DGS-clp	-21.59	**0.985**	1	19.98	1	1
5	GS-tw	**-12**	**0.985**	**1**	18.14	3	3
5	GS-clp	-14.28	**0.985**	1	18.14	3	3
5	GS-pruned	-12.09	**0.985**	**1**	**18.1**	4	3

Table 19: Comparison of the methods in dataset genbase in 5-fold cross-validation, using a treewidth bound of 4. For each fold and method, the conditional log-likelihood in the test dataset (CLL), the global accuracy (acc$_G$), the mean accuracy (acc$_M$), the learning time (time),the treewidth (tw) and the treewidth of the pruned graph (tw–pr) are shown. The optimal results are denoted in boldface.

Fold	Method	CLL	acc$_G$	acc$_M$	time	tw	tw-pr
1	DGS	-14.28	**0.985**	**0.999**	19.77	1	1
1	DGS-clp	**-3.8**	**0.985**	**0.999**	19.77	1	1
1	GS-tw	-19.86	**0.985**	1	18.87	4	4
1	GS-clp	-10.32	**0.985**	1	18.87	4	4
1	GS-pruned	-19.86	**0.985**	1	**18.8**	4	4
2	DGS	-31.35	**0.97**	1	19.45	1	1
2	DGS-clp	-42.69	**0.97**	1	19.45	1	1
2	GS-tw	**-23.3**	**0.97**	**0.999**	19.09	4	3
2	GS-clp	-41.76	**0.97**	1	19.09	4	3
2	GS-pruned	**-23.3**	**0.97**	**0.999**	**18.7**	4	3
3	DGS	-61.44	**0.962**	1	**18**	1	1
3	DGS-clp	-90.64	**0.962**	1	**18**	1	1
3	GS-tw	-49.29	0.95	1	18.24	4	3
3	GS-clp	-87.86	**0.962**	**0.998**	18.24	4	3
3	GS-pruned	**-49.3**	0.95	1	18.44	5	3
4	DGS	-24.61	**0.962**	**0.999**	18.75	2	1
4	DGS-clp	-25.92	**0.962**	**0.999**	18.75	2	1
4	GS-tw	-20.02	**0.962**	**0.999**	**17.5**	4	4
4	GS-clp	-49.4	**0.962**	**0.999**	**17.5**	4	4
4	GS-pruned	**-20**	**0.962**	**0.999**	18.02	5	4
5	DGS	-17.49	**0.985**	1	19.88	1	1
5	DGS-clp	-21.59	**0.985**	1	19.88	1	1
5	GS-tw	**-12.1**	**0.985**	**1**	18.53	4	3
5	GS-clp	-16.38	**0.985**	1	18.53	4	3
5	GS-pruned	**-12.1**	**0.985**	**1**	**18.4**	4	3

Table 20: Comparison of the methods in dataset genbase in 5-fold cross-validation, using a treewidth bound of 5. For each fold and method, the conditional log-likelihood in the test dataset (CLL), the global accuracy (acc_G), the mean accuracy (acc_M), the learning time (time),the treewidth (tw) and the treewidth of the pruned graph (tw–pr) are shown. The optimal results are denoted in boldface.

Fold	Method	CLL	acc_G	acc_M	time	tw	tw-pr
1	DGS	-14.28	**0.985**	**0.999**	19.57	1	1
1	DGS-clp	**-3.8**	**0.985**	**0.999**	19.57	1	1
1	GS-tw	-19.86	**0.985**	1	**18.6**	4	4
1	GS-clp	-10.32	**0.985**	1	**18.6**	4	4
1	GS-pruned	-19.86	**0.985**	1	18.71	4	4
2	DGS	-31.35	**0.97**	1	19.67	1	1
2	DGS-clp	-42.69	**0.97**	1	19.67	1	1
2	GS-tw	**-23.3**	**0.97**	**0.999**	18.83	4	3
2	GS-clp	-41.76	**0.97**	1	18.83	4	3
2	GS-pruned	**-23.3**	**0.97**	**0.999**	**18.7**	4	3
3	DGS	-61.44	**0.962**	1	**18**	1	1
3	DGS-clp	-90.64	**0.962**	1	**18**	1	1
3	GS-tw	**-49.3**	0.95	1	18.46	5	3
3	GS-clp	-87.07	**0.962**	**0.998**	18.46	5	3
3	GS-pruned	**-49.3**	0.95	1	18.48	5	3
4	DGS	-24.61	**0.962**	**0.999**	18.63	2	1
4	DGS-clp	-25.92	**0.962**	**0.999**	18.63	2	1
4	GS-tw	**-20**	**0.962**	**0.999**	17.95	5	4
4	GS-clp	-41.39	**0.962**	**0.999**	17.95	5	4
4	GS-pruned	**-20**	**0.962**	**0.999**	**17.9**	5	4
5	DGS	-17.49	**0.985**	1	19.79	1	1
5	DGS-clp	-21.59	**0.985**	1	19.79	1	1
5	GS-tw	**-12.1**	**0.985**	**1**	**18.2**	4	3
5	GS-clp	-16.38	**0.985**	1	**18.2**	4	3
5	GS-pruned	**-12.1**	**0.985**	**1**	18.2	4	3

Table 21: Comparison of the methods in dataset yeast in 5-fold cross-validation, using a treewidth bound of 2. For each fold and method, the conditional log-likelihood in the test dataset (CLL), the global accuracy (acc_G), the mean accuracy (acc_M), the learning time (time),the treewidth (tw) and the treewidth of the pruned graph (tw–pr) are shown. The optimal results are denoted in boldface.

Fold	Method	CLL	acc_G	acc_M	time	tw	tw-pr
1	DGS	-2192.33	0.14	0.78	2.84	2	2
1	DGS-clp	**-2173.3**	0.13	**0.784**	2.84	2	2
1	GS-tw	-2660.47	**0.143**	0.77	**1.9**	2	2
1	GS-clp	-2611.93	0.08	0.75	**1.9**	2	2
1	GS-pruned	-2260.46	0.12	0.78	2.4	5	2
2	DGS	-2098.62	0.17	0.79	2.59	2	2
2	DGS-clp	**-2089.3**	**0.178**	**0.791**	2.59	2	2
2	GS-tw	-2642.62	0.16	0.79	**1.7**	2	2
2	GS-clp	-2200.91	0.16	0.78	**1.7**	2	2
2	GS-pruned	-2185.57	0.17	0.79	2.43	6	2
3	DGS	-2137.6	0.16	0.79	2.7	2	2
3	DGS-clp	**-2111.1**	0.16	0.79	2.7	2	2
3	GS-tw	-2816.39	0.16	0.79	**1.7**	2	2
3	GS-clp	-2279.63	**0.18**	**0.798**	**1.7**	2	2
3	GS-pruned	-2182.17	0.12	0.78	2.3	4	2
4	DGS	-2194.79	0.12	0.78	2.5	2	2
4	DGS-clp	**-2182.1**	0.12	0.79	2.5	2	2
4	GS-tw	-2740.16	0.11	0.77	**2**	2	2
4	GS-clp	-2226.07	**0.128**	**0.788**	**2**	2	2
4	GS-pruned	-2270.94	0.09	0.77	2.36	5	2
5	DGS	-2089.25	**0.18**	0.79	2.45	2	2
5	DGS-clp	**-2078.1**	0.17	0.79	2.45	2	2
5	GS-tw	-2489.37	0.18	0.78	**1.6**	2	2
5	GS-clp	-2139.19	**0.18**	**0.79**	**1.6**	2	2
5	GS-pruned	-2115.9	**0.18**	0.79	2.5	6	2

Table 22: Comparison of the methods in dataset yeast in 5-fold cross-validation, using a treewidth bound of 3. For each fold and method, the conditional log-likelihood in the test dataset (CLL), the global accuracy (acc_G), the mean accuracy (acc_M), the learning time (time),the treewidth (tw) and the treewidth of the pruned graph (tw–pr) are shown. The optimal results are denoted in boldface.

Fold	Method	CLL	acc_G	acc_M	time	tw	tw-pr
1	DGS	-2045.9	0.19	0.78	2.83	3	3
1	DGS-clp	**-2018**	**0.194**	**0.78**	2.83	3	3
1	GS-tw	-2116.96	0.18	0.78	2.81	3	3
1	GS-clp	-2055.3	0.19	0.78	2.81	3	3
1	GS-pruned	-2109.76	0.17	0.77	**2.3**	6	3
2	DGS	-1984.15	**0.186**	0.79	2.78	3	3
2	DGS-clp	**-1969.7**	0.18	**0.795**	2.78	3	3
2	GS-tw	-2039.12	0.18	0.79	2.6	3	3
2	GS-clp	-1990.05	0.18	0.79	2.6	3	3
2	GS-pruned	-2036.01	0.18	0.78	**2.5**	5	3
3	DGS	-2017.79	0.18	**0.792**	2.95	3	3
3	DGS-clp	**-1988.3**	0.18	0.79	2.95	3	3
3	GS-tw	-2120.75	**0.19**	0.79	**2.3**	3	3
3	GS-clp	-1998.96	**0.19**	0.79	**2.3**	3	3
3	GS-pruned	-2058.6	0.17	0.78	2.38	5	3
4	DGS	-2008.69	**0.168**	0.78	2.77	3	3
4	DGS-clp	-2002.13	0.16	**0.784**	2.77	3	3
4	GS-tw	-2031.25	0.16	0.78	**2.3**	3	3
4	GS-clp	**-1997.6**	0.16	0.78	**2.3**	3	3
4	GS-pruned	-2066.41	0.15	0.78	2.55	6	3
5	DGS	-1979.35	0.2	0.79	2.64	3	3
5	DGS-clp	-1966.5	0.19	0.79	2.64	3	3
5	GS-tw	-1982.61	0.21	**0.795**	2.55	3	3
5	GS-clp	**-1947.1**	**0.217**	0.79	2.55	3	3
5	GS-pruned	-1964.74	0.2	0.79	**2.4**	6	3

Table 23: Comparison of the methods in dataset yeast in 5-fold cross-validation, using a treewidth bound of 4. For each fold and method, the conditional log-likelihood in the test dataset (CLL), the global accuracy (acc_G), the mean accuracy (acc_M), the learning time (time),the treewidth (tw) and the treewidth of the pruned graph (tw–pr) are shown. The optimal results are denoted in boldface.

Fold	Method	CLL	acc_G	acc_M	time	tw	tw-pr
1	DGS	-1998.73	0.19	0.78	3.2	4	4
1	DGS-clp	**-1973.6**	**0.205**	**0.783**	3.2	4	4
1	GS-tw	-2038.22	0.19	0.78	2.87	4	4
1	GS-clp	-2000.96	0.19	0.77	2.87	4	4
1	GS-pruned	-2030.35	0.19	0.78	**2.6**	6	4
2	DGS	-1962.04	**0.188**	0.79	2.97	4	4
2	DGS-clp	**-1947.8**	0.18	**0.794**	2.97	4	4
2	GS-tw	-2012.18	0.17	0.79	2.66	4	4
2	GS-clp	-1996.68	0.17	0.78	2.66	4	4
2	GS-pruned	-2015.46	0.18	0.78	**2.5**	5	4
3	DGS	-1980	**0.197**	0.79	3.04	4	4
3	DGS-clp	**-1955.5**	0.19	**0.794**	3.04	4	4
3	GS-tw	-2017.83	0.18	0.79	2.94	4	4
3	GS-clp	-1968.22	0.19	0.79	2.94	4	4
3	GS-pruned	-2023.37	0.18	0.78	**2.6**	5	4
4	DGS	-1973.53	**0.18**	0.79	2.85	4	4
4	DGS-clp	**-1966.7**	0.16	**0.786**	2.85	4	4
4	GS-tw	-2002.32	0.15	0.78	2.86	4	4
4	GS-clp	-1987.94	0.16	0.78	2.86	4	4
4	GS-pruned	-2038.18	0.15	0.77	**2.4**	5	4
5	DGS	-1927.96	0.19	**0.791**	3.13	4	4
5	DGS-clp	**-1910.8**	0.2	0.79	3.13	4	4
5	GS-tw	-1933.26	**0.209**	0.79	3.06	4	4
5	GS-clp	-1927.73	0.2	0.79	3.06	4	4
5	GS-pruned	-1934.79	0.2	0.79	**2.6**	6	4

Table 24: Comparison of the methods in dataset yeast in 5-fold cross-validation, using a treewidth bound of 5. For each fold and method, the conditional log-likelihood in the test dataset (CLL), the global accuracy (acc_G), the mean accuracy (acc_M), the learning time (time),the treewidth (tw) and the treewidth of the pruned graph (tw–pr) are shown. The optimal results are denoted in boldface.

Fold	Method	CLL	acc_G	acc_M	time	tw	tw-pr
1	DGS	-1979.19	0.2	0.78	3.52	5	5
1	DGS-clp	**-1955.7**	**0.213**	**0.783**	3.52	5	5
1	GS-tw	-2007.4	0.17	0.77	3.07	5	5
1	GS-clp	-1993.13	0.18	0.77	3.07	5	5
1	GS-pruned	-2023.76	0.18	0.77	**2.5**	6	5
2	DGS	-1962.04	**0.188**	0.79	3.2	4	4
2	DGS-clp	**-1947.8**	0.18	**0.794**	3.2	4	4
2	GS-tw	-2023.42	0.18	0.78	2.79	5	5
2	GS-clp	-2010.23	0.18	0.78	2.79	5	5
2	GS-pruned	-2023.37	0.18	0.78	**2.3**	5	5
3	DGS	-1976.93	**0.199**	0.79	3.54	5	5
3	DGS-clp	**-1952**	0.19	**0.795**	3.54	5	5
3	GS-tw	-2034.29	0.19	0.79	2.82	5	5
3	GS-clp	-1987.55	0.18	0.79	2.82	5	5
3	GS-pruned	-2031.61	0.18	0.78	**2.7**	5	5
4	DGS	-1955.15	**0.174**	**0.786**	3.04	5	5
4	DGS-clp	**-1948.8**	0.16	**0.786**	3.04	5	5
4	GS-tw	-1991.59	0.15	0.78	2.89	5	5
4	GS-clp	-1986.86	0.15	0.78	2.89	5	5
4	GS-pruned	-2018.41	0.15	0.77	**2.5**	6	5
5	DGS	-1922.15	0.19	**0.79**	2.89	5	5
5	DGS-clp	**-1903.6**	**0.203**	0.79	2.89	5	5
5	GS-tw	-1924.62	0.2	0.79	2.9	5	5
5	GS-clp	-1914.44	0.2	0.79	2.9	5	5
5	GS-pruned	-1930.62	**0.203**	0.79	**2.3**	6	5

Table 25: Comparison of the methods in dataset medical in 5-fold cross-validation, using a treewidth bound of 2. For each fold and method, the conditional log-likelihood in the test dataset (CLL), the global accuracy (acc_G), the mean accuracy (acc_M), the learning time (time),the treewidth (tw) and the treewidth of the pruned graph (tw–pr) are shown. The optimal results are denoted in boldface.

Fold	Method	CLL	acc_G	acc_M	time	tw	tw-pr
1	DGS	**-297.1**	0.62	0.99	**88.5**	2	1
1	DGS-clp	-317.2	**0.663**	**0.989**	**88.5**	2	1
1	GS-tw	-459.99	0.55	0.99	182.41	2	2
1	GS-clp	-339.2	0.62	0.99	182.41	2	2
1	GS-pruned	-365.45	0.63	0.99	221.29	20	2
2	DGS	**-325.3**	0.67	0.99	**92.6**	2	1
2	DGS-clp	-327.56	**0.679**	**0.989**	**92.6**	2	1
2	GS-tw	-478.11	0.6	0.99	170.01	2	2
2	GS-clp	-368.45	0.62	0.99	170.01	2	2
2	GS-pruned	-343.09	0.61	0.99	203.29	18	2
3	DGS	**-249**	0.69	**0.991**	**97.1**	2	1
3	DGS-clp	-251.1	**0.704**	0.99	**97.1**	2	1
3	GS-tw	-376.55	0.6	0.99	188.42	2	2
3	GS-clp	-298.22	0.65	0.99	188.42	2	2
3	GS-pruned	-295.64	0.62	0.99	224.87	20	2
4	DGS	**-341.9**	0.59	0.99	**90.1**	2	2
4	DGS-clp	-376.74	0.59	0.99	**90.1**	2	2
4	GS-tw	-452.76	0.58	0.99	185.87	2	2
4	GS-clp	-382.54	0.58	0.99	185.87	2	2
4	GS-pruned	-377.71	**0.621**	**0.988**	237.23	19	2
5	DGS	**-277.7**	0.64	0.99	**89.9**	2	1
5	DGS-clp	-287.12	**0.682**	**0.99**	**89.9**	2	1
5	GS-tw	-378.15	0.62	0.99	181.93	2	2
5	GS-clp	-327.35	0.68	0.99	181.93	2	2
5	GS-pruned	-322.51	0.66	0.99	231.24	16	2

Table 26: Comparison of the methods in dataset medical in 5-fold cross-validation, using a treewidth bound of 3. For each fold and method, the conditional log-likelihood in the test dataset (CLL), the global accuracy (acc_G), the mean accuracy (acc_M), the learning time (time),the treewidth (tw) and the treewidth of the pruned graph (tw–pr) are shown. The optimal results are denoted in boldface.

Fold	Method	CLL	acc_G	acc_M	time	tw	tw-pr
1	DGS	**-283.5**	0.65	0.99	**91.3**	3	2
1	DGS-clp	-291.64	**0.658**	0.99	**91.3**	3	2
1	GS-tw	-396.33	0.57	0.99	223.35	3	3
1	GS-clp	-368.83	0.64	**0.989**	223.35	3	3
1	GS-pruned	-361.57	0.61	0.99	241.87	20	3
2	DGS	**-308**	**0.663**	0.99	**91.9**	3	2
2	DGS-clp	-323.19	0.65	0.99	**91.9**	3	2
2	GS-tw	-384	0.62	0.99	212	3	3
2	GS-clp	-338.26	0.64	0.99	212	3	3
2	GS-pruned	-341.38	0.63	**0.988**	221.57	20	3
3	DGS	**-248.3**	0.69	**0.991**	**96.6**	3	1
3	DGS-clp	-251.98	**0.704**	0.99	**96.6**	3	1
3	GS-tw	-300.24	0.64	0.99	232.62	3	3
3	GS-clp	-319.13	0.62	0.99	232.62	3	3
3	GS-pruned	-298.75	0.65	0.99	245.04	22	3
4	DGS	**-331.2**	**0.605**	**0.988**	**92.3**	3	2
4	DGS-clp	-357.54	0.6	0.99	**92.3**	3	2
4	GS-tw	-432.17	0.57	0.99	231.52	3	3
4	GS-clp	-400.04	0.57	0.99	231.52	3	3
4	GS-pruned	-390.18	0.6	0.99	235.87	19	3
5	DGS	**-273.9**	0.64	0.99	**96.4**	3	1
5	DGS-clp	-289.16	**0.677**	**0.99**	**96.4**	3	1
5	GS-tw	-331.65	0.64	0.99	218.36	3	3
5	GS-clp	-333.48	0.65	0.99	218.36	3	3
5	GS-pruned	-329.74	0.63	0.99	231.44	16	3

Table 27: Comparison of the methods in dataset medical in 5-fold cross-validation, using a treewidth bound of 4. For each fold and method, the conditional log-likelihood in the test dataset (CLL), the global accuracy (acc_G), the mean accuracy (acc_M), the learning time (time),the treewidth (tw) and the treewidth of the pruned graph (tw–pr) are shown. The optimal results are denoted in boldface.

Fold	Method	CLL	acc_G	acc_M	time	tw	tw-pr
1	DGS	**-283.5**	0.65	0.99	**93.7**	3	2
1	DGS-clp	-291.64	0.66	0.99	**93.7**	3	2
1	GS-tw	-386.58	0.58	0.99	220.73	4	3
1	GS-clp	-362.49	**0.658**	**0.989**	220.73	4	3
1	GS-pruned	-361.57	0.61	0.99	227.32	20	3
2	DGS	**-308**	**0.663**	0.99	**95.8**	3	2
2	DGS-clp	-323.19	0.65	0.99	**95.8**	3	2
2	GS-tw	-359.65	0.63	0.99	214.23	4	4
2	GS-clp	-375.46	0.63	0.99	214.23	4	4
2	GS-pruned	-342.07	0.63	**0.988**	209.79	20	4
3	DGS	**-248.3**	0.69	**0.991**	**99.1**	3	1
3	DGS-clp	-251.98	**0.704**	0.99	**99.1**	3	1
3	GS-tw	-302.69	0.65	0.99	226.99	4	3
3	GS-clp	-305.31	0.67	0.99	226.99	4	3
3	GS-pruned	-298.75	0.65	0.99	229.07	22	3
4	DGS	**-331.2**	**0.605**	**0.988**	**94.6**	3	2
4	DGS-clp	-357.54	0.6	0.99	**94.6**	3	2
4	GS-tw	-408.62	0.59	0.99	218.29	4	4
4	GS-clp	-398.08	0.6	0.99	218.29	4	4
4	GS-pruned	-394.87	0.6	0.99	227.9	19	4
5	DGS	**-273.9**	0.64	0.99	**95.5**	3	1
5	DGS-clp	-289.16	**0.677**	**0.99**	**95.5**	3	1
5	GS-tw	-324.49	0.63	0.99	213.73	4	3
5	GS-clp	-300.53	0.65	0.99	213.73	4	3
5	GS-pruned	-329.74	0.63	0.99	219.21	16	3

Table 28: Comparison of the methods in dataset medical in 5-fold cross-validation, using a treewidth bound of 5. For each fold and method, the conditional log-likelihood in the test dataset (CLL), the global accuracy (acc_G), the mean accuracy (acc_M), the learning time (time),the treewidth (tw) and the treewidth of the pruned graph (tw–pr) are shown. The optimal results are denoted in boldface.

Fold	Method	CLL	acc_G	acc_M	time	tw	tw-pr
1	DGS	**-283.5**	0.65	0.99	**93.5**	3	2
1	DGS-clp	-291.64	**0.658**	**0.989**	**93.5**	3	2
1	GS-tw	-380.44	0.58	0.99	221.47	5	3
1	GS-clp	-356.73	0.65	0.99	221.47	5	3
1	GS-pruned	-361.57	0.61	0.99	230.65	20	3
2	DGS	**-308**	0.66	0.99	**91**	3	2
2	DGS-clp	-323.19	0.65	0.99	**91**	3	2
2	GS-tw	-352.29	0.63	0.99	216.3	5	4
2	GS-clp	-325.75	**0.668**	**0.989**	216.3	5	4
2	GS-pruned	-342.07	0.63	0.99	211.38	20	4
3	DGS	**-248.3**	0.69	**0.991**	**99.2**	3	1
3	DGS-clp	-251.98	**0.704**	0.99	**99.2**	3	1
3	GS-tw	-294.97	0.64	0.99	234.83	5	3
3	GS-clp	-313.04	0.68	0.99	234.83	5	3
3	GS-pruned	-298.75	0.65	0.99	230.21	22	3
4	DGS	**-331.2**	**0.605**	**0.988**	**93.9**	3	2
4	DGS-clp	-357.54	0.6	0.99	**93.9**	3	2
4	GS-tw	-405.3	0.59	0.99	223.41	5	3
4	GS-clp	-385.28	0.59	0.99	223.41	5	3
4	GS-pruned	-394.87	0.6	0.99	226.14	19	4
5	DGS	**-273.9**	0.64	0.99	**93.3**	3	1
5	DGS-clp	-289.16	**0.677**	**0.99**	**93.3**	3	1
5	GS-tw	-318.9	0.63	0.99	230.34	5	3
5	GS-clp	-302.74	0.67	0.99	230.34	5	3
5	GS-pruned	-329.74	0.63	0.99	217.13	16	3

Table 29: Comparison of the methods in dataset enron in 5-fold cross-validation, using a treewidth bound of 2. For each fold and method, the conditional log-likelihood in the test dataset (CLL), the global accuracy (acc_G), the mean accuracy (acc_M), the learning time (time),the treewidth (tw) and the treewidth of the pruned graph (tw–pr) are shown. The optimal results are denoted in boldface.

Fold	Method	CLL	acc_G	acc_M	time	tw	tw-pr
1	DGS	-2230	0.18	0.95	516.89	2	2
1	DGS-clp	**-2208.9**	**0.208**	**0.954**	516.89	2	2
1	GS-tw	-4945.07	0.16	0.95	**465.2**	2	2
1	GS-clp	-2509.63	0.15	0.95	**465.2**	2	2
1	GS-pruned	-2540.47	0.18	0.95	879.31	301	2
2	DGS	-2343.35	0.13	0.95	502.19	2	2
2	DGS-clp	**-2328.4**	0.12	**0.95**	502.19	2	2
2	GS-tw	-6225.88	0.12	0.95	**499.8**	2	2
2	GS-clp	-3354.15	0.12	0.95	**499.8**	2	2
2	GS-pruned	-2601.76	**0.138**	0.95	865.86	290	2
3	DGS	-2598.96	0.12	0.95	525.1	2	2
3	DGS-clp	**-2585**	0.13	**0.948**	525.1	2	2
3	GS-tw	-6974.26	0.12	0.95	**466.3**	2	2
3	GS-clp	-2786.05	0.13	0.94	**466.3**	2	2
3	GS-pruned	-2955.42	**0.147**	0.95	832.53	285	2
4	DGS	-2369	0.13	**0.951**	527.42	2	2
4	DGS-clp	**-2362.3**	0.13	0.95	527.42	2	2
4	GS-tw	-5536.03	0.13	0.95	**502.1**	2	2
4	GS-clp	-3175.06	0.11	0.94	**502.1**	2	2
4	GS-pruned	-2640.17	**0.138**	0.95	852.39	321	2
5	DGS	-2481.97	0.14	0.95	511.71	2	2
5	DGS-clp	**-2468.7**	**0.153**	**0.951**	511.71	2	2
5	GS-tw	-6744.56	0.12	0.95	**470.6**	2	2
5	GS-clp	-3092.26	0.12	0.95	**470.6**	2	2
5	GS-pruned	-3112.37	0.14	0.95	817.18	280	2

Table 30: Comparison of the methods in dataset enron in 5-fold cross-validation, using a treewidth bound of 3. For each fold and method, the conditional log-likelihood in the test dataset (CLL), the global accuracy (acc_G), the mean accuracy (acc_M), the learning time (time),the treewidth (tw) and the treewidth of the pruned graph (tw–pr) are shown. The optimal results are denoted in boldface.

Fold	Method	CLL	acc_G	acc_M	time	tw	tw-pr
1	DGS	-2228.26	0.18	0.95	**566**	3	3
1	DGS-clp	**-2206.5**	**0.208**	**0.954**	**566**	3	3
1	GS-tw	-3546.09	0.18	0.95	737.09	3	3
1	GS-clp	-2506.06	0.17	0.95	737.09	3	3
1	GS-pruned	-2487.65	0.19	0.95	861.36	278	3
2	DGS	-2320.67	0.12	0.95	**589.1**	3	3
2	DGS-clp	**-2300.6**	0.12	**0.951**	**589.1**	3	3
2	GS-tw	-3954.07	**0.138**	0.95	694.1	3	3
2	GS-clp	-2972.07	0.12	0.95	694.1	3	3
2	GS-pruned	-2668.47	0.13	0.95	892.97	306	3
3	DGS	-2581.5	0.14	0.95	**565**	3	3
3	DGS-clp	**-2571.4**	0.13	**0.948**	**565**	3	3
3	GS-tw	-4502.73	0.13	0.95	649.7	3	3
3	GS-clp	-3464.55	0.13	0.94	649.7	3	3
3	GS-pruned	-2976.54	**0.147**	0.95	858.14	295	3
4	DGS	-2334.63	0.14	**0.95**	**578**	3	3
4	DGS-clp	**-2325.6**	0.14	0.95	**578**	3	3
4	GS-tw	-3371.59	**0.162**	0.95	687.44	3	3
4	GS-clp	-2875.02	0.12	0.95	687.44	3	3
4	GS-pruned	-2669.71	0.15	0.95	868.05	302	3
5	DGS	-2450.76	0.15	0.95	**555.8**	3	3
5	DGS-clp	**-2436.6**	**0.153**	**0.952**	**555.8**	3	3
5	GS-tw	-5049.49	0.12	0.95	629.29	3	3
5	GS-clp	-2770.65	0.12	0.95	629.29	3	3
5	GS-pruned	-3085.85	0.13	0.95	830.34	286	3

Table 31: Comparison of the methods in dataset enron in 5-fold cross-validation, using a treewidth bound of 4. For each fold and method, the conditional log-likelihood in the test dataset (CLL), the global accuracy (acc_G), the mean accuracy (acc_M), the learning time (time),the treewidth (tw) and the treewidth of the pruned graph (tw–pr) are shown. The optimal results are denoted in boldface.

Fold	Method	CLL	acc_G	acc_M	time	tw	tw-pr
1	DGS	-2185.81	0.2	0.95	**643.1**	4	4
1	DGS-clp	**-2163.9**	**0.226**	**0.954**	**643.1**	4	4
1	GS-tw	-3171.39	0.19	0.95	680.08	4	4
1	GS-clp	-2527.01	0.17	0.95	680.08	4	4
1	GS-pruned	-2436.24	0.2	0.95	889.45	287	4
2	DGS	-2320.25	0.12	0.95	**635**	4	4
2	DGS-clp	**-2299.1**	0.13	**0.951**	**635**	4	4
2	GS-tw	-3709.44	**0.141**	0.95	680.87	4	4
2	GS-clp	-2808.06	0.1	0.95	680.87	4	4
2	GS-pruned	-2660.41	0.13	0.95	888.34	312	4
3	DGS	-2578.17	0.14	0.95	644.82	4	4
3	DGS-clp	**-2569.6**	0.14	**0.948**	644.82	4	4
3	GS-tw	-4157.39	0.13	0.95	**631.3**	4	4
3	GS-clp	-2993.42	0.14	**0.948**	**631.3**	4	4
3	GS-pruned	-2941.35	**0.147**	0.95	867.92	288	4
4	DGS	-2335.72	0.14	0.95	**633**	4	4
4	DGS-clp	**-2326.1**	**0.15**	0.95	**633**	4	4
4	GS-tw	-3008.88	0.14	0.95	687.45	4	4
4	GS-clp	-2483.79	0.13	**0.951**	687.45	4	4
4	GS-pruned	-2646.01	**0.15**	0.95	903.22	299	4
5	DGS	-2416.73	0.14	0.95	**625.3**	4	4
5	DGS-clp	**-2405**	**0.153**	**0.95**	**625.3**	4	4
5	GS-tw	-4523.7	0.13	0.95	627.91	4	4
5	GS-clp	-3014.18	0.11	0.95	627.91	4	4
5	GS-pruned	-3075.93	0.14	0.95	849.94	272	4

Table 32: Comparison of the methods in dataset enron in 5-fold cross-validation, using a treewidth bound of 5. For each fold and method, the conditional log-likelihood in the test dataset (CLL), the global accuracy (acc_G), the mean accuracy (acc_M), the learning time (time),the treewidth (tw) and the treewidth of the pruned graph (tw–pr) are shown. The optimal results are denoted in boldface.

Fold	Method	CLL	acc_G	acc_M	time	tw	tw-pr
1	DGS	-2182.96	0.2	0.95	**685.1**	5	4
1	DGS-clp	**-2161.1**	**0.223**	**0.954**	**685.1**	5	4
1	GS-tw	-3075.4	0.19	0.95	729.43	5	5
1	GS-clp	-2485.14	0.2	0.95	729.43	5	5
1	GS-pruned	-2472.03	0.18	0.95	914.53	298	5
2	DGS	-2320.25	0.12	0.95	**686.1**	4	4
2	DGS-clp	**-2299.1**	0.13	**0.951**	**686.1**	4	4
2	GS-tw	-3450.06	**0.129**	0.95	693.06	5	5
2	GS-clp	-2784.21	0.12	0.95	693.06	5	5
2	GS-pruned	-2655.29	**0.129**	0.95	888.46	303	4
3	DGS	-2582.09	0.14	0.95	769.64	5	4
3	DGS-clp	**-2573.8**	0.14	0.95	769.64	5	4
3	GS-tw	-3944.27	0.14	0.94	**669**	5	5
3	GS-clp	-2943.77	0.14	**0.949**	**669**	5	5
3	GS-pruned	-2970.11	**0.147**	0.95	898.75	286	4
4	DGS	-2338.75	0.15	0.95	**728.8**	5	4
4	DGS-clp	**-2330.1**	0.15	**0.95**	**728.8**	5	4
4	GS-tw	-3002.33	**0.156**	0.95	759.91	5	5
4	GS-clp	-2686.29	0.12	0.95	759.91	5	5
4	GS-pruned	-2642.63	0.15	0.95	931.31	310	4
5	DGS	-2417.49	0.14	0.95	671.63	5	4
5	DGS-clp	**-2405.2**	**0.153**	**0.95**	671.63	5	4
5	GS-tw	-4351.29	0.13	0.95	**655.9**	5	5
5	GS-clp	-2888.93	0.13	0.95	**655.9**	5	5
5	GS-pruned	-3072.84	0.12	0.95	872.62	282	5

Table 33: Comparison of the methods in dataset ohsumed in 5-fold cross-validation, using a treewidth bound of 2. For each fold and method, the conditional log-likelihood in the test dataset (CLL), the global accuracy (acc_G), the mean accuracy (acc_M), the learning time (time),the treewidth (tw) and the treewidth of the pruned graph (tw–pr) are shown. The optimal results are denoted in boldface.

Fold	Method	CLL	acc_G	acc_M	time	tw	tw-pr
1	DGS	-10585.72	**0.239**	0.94	513.48	2	2
1	DGS-clp	**-10516.5**	0.23	0.94	513.48	2	2
1	GS-tw	-13210.81	0.2	0.94	**233.5**	2	2
1	GS-clp	-10683.48	0.23	0.94	**233.5**	2	2
1	GS-pruned	-10745.48	0.23	**0.945**	473.26	177	2
2	DGS	-10511	**0.239**	**0.944**	515.66	2	2
2	DGS-clp	**-10456.9**	0.24	0.94	515.66	2	2
2	GS-tw	-13114.68	0.2	0.94	**239.6**	2	2
2	GS-clp	-10613.86	0.23	0.94	**239.6**	2	2
2	GS-pruned	-10738.35	0.24	0.94	482.9	172	2
3	DGS	-10703.43	0.24	**0.944**	527.64	2	2
3	DGS-clp	**-10659.4**	**0.246**	0.94	527.64	2	2
3	GS-tw	-13287.28	0.21	0.94	**234.1**	2	2
3	GS-clp	-10801.13	0.23	0.94	**234.1**	2	2
3	GS-pruned	-10794.84	0.24	0.94	468.76	171	2
4	DGS	-10697.67	0.24	0.94	544.44	2	2
4	DGS-clp	**-10640.4**	0.24	**0.943**	544.44	2	2
4	GS-tw	-13091.09	0.21	0.94	**239.9**	2	2
4	GS-clp	-11199.58	0.23	0.94	**239.9**	2	2
4	GS-pruned	-10879.39	**0.239**	0.94	487.51	173	2
5	DGS	-10695.9	0.23	0.94	531.76	2	2
5	DGS-clp	**-10629**	0.23	**0.944**	531.76	2	2
5	GS-tw	-13430.92	0.21	0.94	**238**	2	2
5	GS-clp	-11380.13	0.22	0.94	**238**	2	2
5	GS-pruned	-10925.12	**0.239**	0.94	467.16	170	2

Table 34: Comparison of the methods in dataset ohsumed in 5-fold cross-validation, using a treewidth bound of 3. For each fold and method, the conditional log-likelihood in the test dataset (CLL), the global accuracy (acc_G), the mean accuracy (acc_M), the learning time (time),the treewidth (tw) and the treewidth of the pruned graph (tw–pr) are shown. The optimal results are denoted in boldface.

Fold	Method	CLL	acc_G	acc_M	time	tw	tw-pr
1	DGS	-10470.96	0.24	0.95	596.33	3	3
1	DGS-clp	**-10416.1**	0.24	0.95	596.33	3	3
1	GS-tw	-11908.4	0.22	0.94	**314.7**	3	3
1	GS-clp	-10789.73	**0.244**	0.94	**314.7**	3	3
1	GS-pruned	-10663.21	0.24	**0.945**	499.53	175	3
2	DGS	-10506.17	0.24	**0.944**	604.36	3	3
2	DGS-clp	**-10452.1**	0.24	0.94	604.36	3	3
2	GS-tw	-11638.21	0.23	0.94	**320.4**	3	3
2	GS-clp	-10525.21	0.24	0.94	**320.4**	3	3
2	GS-pruned	-10663.87	**0.246**	0.94	491.28	169	3
3	DGS	-10600.59	**0.251**	**0.945**	639.68	3	3
3	DGS-clp	**-10571.8**	**0.251**	0.94	639.68	3	3
3	GS-tw	-11994.52	0.22	0.94	**323.4**	3	3
3	GS-clp	-10879.78	0.23	0.94	**323.4**	3	3
3	GS-pruned	-10779.47	0.25	**0.945**	488.49	175	3
4	DGS	-10686.93	0.23	0.94	602.6	3	3
4	DGS-clp	**-10633.9**	0.23	0.94	602.6	3	3
4	GS-tw	-11902.49	0.23	0.94	**326.2**	3	3
4	GS-clp	-10876.01	0.24	**0.944**	**326.2**	3	3
4	GS-pruned	-10846.24	**0.242**	0.94	496.2	167	3
5	DGS	-10703.08	0.23	0.94	609.17	3	3
5	DGS-clp	**-10638.5**	0.23	**0.944**	609.17	3	3
5	GS-tw	-12153.04	0.22	0.94	**319.2**	3	3
5	GS-clp	-11089.49	0.23	0.94	**319.2**	3	3
5	GS-pruned	-10896.06	**0.244**	0.94	469.98	180	3

Table 35: Comparison of the methods in dataset ohsumed in 5-fold cross-validation, using a treewidth bound of 4. For each fold and method, the conditional log-likelihood in the test dataset (CLL), the global accuracy (acc_G), the mean accuracy (acc_M), the learning time (time),the treewidth (tw) and the treewidth of the pruned graph (tw–pr) are shown. The optimal results are denoted in boldface.

Fold	Method	CLL	acc_G	acc_M	time	tw	tw-pr
1	DGS	-10379.37	0.24	0.95	638.99	4	4
1	DGS-clp	**-10325.3**	0.24	0.95	638.99	4	4
1	GS-tw	-11508.74	0.23	0.94	**356.6**	4	4
1	GS-clp	-10663.18	**0.244**	0.94	**356.6**	4	4
1	GS-pruned	-10645.1	0.24	**0.945**	525.42	176	4
2	DGS	-10457.92	**0.248**	**0.944**	761.95	4	4
2	DGS-clp	**-10403**	0.24	0.94	761.95	4	4
2	GS-tw	-11495.26	0.24	0.94	**353.7**	4	4
2	GS-clp	-10736.82	0.24	0.94	**353.7**	4	4
2	GS-pruned	-10681.22	0.25	0.94	504.34	175	4
3	DGS	-10539.04	0.25	**0.945**	779.53	4	4
3	DGS-clp	**-10508.9**	**0.253**	0.94	779.53	4	4
3	GS-tw	-11634.14	0.23	0.94	**364.4**	4	4
3	GS-clp	-10691.9	0.24	0.94	**364.4**	4	4
3	GS-pruned	-10737.43	0.25	0.94	520.56	173	4
4	DGS	-10636.07	0.24	0.94	715.77	4	4
4	DGS-clp	**-10587.5**	0.23	0.94	715.77	4	4
4	GS-tw	-11554.26	0.24	0.94	**363.3**	4	4
4	GS-clp	-10654.76	0.24	**0.944**	**363.3**	4	4
4	GS-pruned	-10786.37	**0.254**	0.94	510.39	176	4
5	DGS	-10626.17	0.24	0.94	729.99	4	4
5	DGS-clp	**-10562.7**	0.24	0.94	729.99	4	4
5	GS-tw	-11673.81	0.24	0.94	**384.3**	4	4
5	GS-clp	-10846.8	0.25	0.94	**384.3**	4	4
5	GS-pruned	-10835.45	**0.252**	**0.944**	496.44	170	4

Table 36: Comparison of the methods in dataset ohsumed in 5-fold cross-validation, using a treewidth bound of 5. For each fold and method, the conditional log-likelihood in the test dataset (CLL), the global accuracy (acc_G), the mean accuracy (acc_M), the learning time (time),the treewidth (tw) and the treewidth of the pruned graph (tw–pr) are shown. The optimal results are denoted in boldface.

Fold	Method	CLL	acc_G	acc_M	time	tw	tw-pr
1	DGS	-10384.76	0.24	0.95	771.87	5	5
1	DGS-clp	**-10326.2**	0.24	0.95	771.87	5	5
1	GS-tw	-11287.85	0.23	0.94	**400.5**	5	5
1	GS-clp	-10443.61	**0.247**	0.95	**400.5**	5	5
1	GS-pruned	-10558.59	0.24	**0.946**	533.56	163	5
2	DGS	-10465.5	**0.253**	**0.944**	896.56	5	5
2	DGS-clp	**-10410.9**	0.25	0.94	896.56	5	5
2	GS-tw	-11265.4	0.24	0.94	**386.1**	5	5
2	GS-clp	-10560.3	0.25	0.94	**386.1**	5	5
2	GS-pruned	-10652.25	0.25	0.94	508	175	5
3	DGS	-10534.18	**0.251**	**0.945**	894.1	5	5
3	DGS-clp	**-10505.3**	0.25	0.94	894.1	5	5
3	GS-tw	-11471.09	0.23	0.94	**421.6**	5	5
3	GS-clp	-10605.64	0.24	0.94	**421.6**	5	5
3	GS-pruned	-10683.44	0.25	0.94	514.42	175	5
4	DGS	-10619.17	0.24	0.94	877.31	5	5
4	DGS-clp	**-10566.8**	0.24	0.94	877.31	5	5
4	GS-tw	-11437.73	0.24	0.94	**398.5**	5	5
4	GS-clp	-10642.31	**0.256**	**0.944**	**398.5**	5	5
4	GS-pruned	-10715.44	0.25	0.94	516.16	169	5
5	DGS	-10552.22	0.25	**0.944**	920.54	5	5
5	DGS-clp	**-10494.9**	0.24	**0.944**	920.54	5	5
5	GS-tw	-11597.13	0.24	0.94	**406.8**	5	5
5	GS-clp	-10788.52	0.24	0.94	**406.8**	5	5
5	GS-pruned	-10806.91	**0.25**	0.94	491.91	174	5

Table 37: Comparison of the methods in dataset reutersk500 in 5-fold cross-validation, using a treewidth bound of 2. For each fold and method, the conditional log-likelihood in the test dataset (CLL), the global accuracy (acc_G), the mean accuracy (acc_M), the learning time (time),the treewidth (tw) and the treewidth of the pruned graph (tw–pr) are shown. The optimal results are denoted in boldface.

Fold	Method	CLL	acc_G	acc_M	time	tw	tw-pr
1	DGS	-7006.06	0.03	0.99	14.96	2	2
1	DGS-clp	-7005.76	0.03	0.99	14.96	2	2
1	GS-tw	-7011.71	0.03	0.99	**8.1**	2	2
1	GS-clp	-7011.37	0.03	0.99	**8.1**	2	2
1	GS-pruned	**-7003.8**	**0.061**	**0.986**	8.05	3	2
2	DGS	-6863.31	0.03	0.99	15.1	2	2
2	DGS-clp	-6862.38	0.03	0.99	15.1	2	2
2	GS-tw	-6857.9	0.03	0.99	**8**	2	2
2	GS-clp	**-6856.9**	0.03	0.99	**8**	2	2
2	GS-pruned	-6862.44	**0.044**	**0.986**	8.07	4	2
3	DGS	**-6934.8**	**0.022**	**0.986**	15.39	2	2
3	DGS-clp	-6935.61	**0.022**	**0.986**	15.39	2	2
3	GS-tw	-6946.74	**0.022**	**0.986**	**8**	2	2
3	GS-clp	-6947.38	**0.022**	**0.986**	**8**	2	2
3	GS-pruned	-6947.91	0.01	0.99	8.09	3	2
4	DGS	-6988.74	0.03	0.99	14.96	2	2
4	DGS-clp	**-6988.6**	0.03	0.99	14.96	2	2
4	GS-tw	-6989.59	0.03	0.99	**7.8**	2	2
4	GS-clp	-6989.34	0.03	0.99	**7.8**	2	2
4	GS-pruned	-6990.22	**0.047**	**0.986**	7.84	4	2
5	DGS	-7068.12	**0.02**	**0.986**	16.13	2	2
5	DGS-clp	-7067.88	**0.02**	**0.986**	16.13	2	2
5	GS-tw	-7064.29	**0.02**	**0.986**	**8.5**	2	2
5	GS-clp	-7064	**0.02**	**0.986**	**8.5**	2	2
5	GS-pruned	**-7054.9**	0.02	0.99	8.71	4	2

Table 38: Comparison of the methods in dataset reutersk500 in 5-fold cross-validation, using a treewidth bound of 3. For each fold and method, the conditional log-likelihood in the test dataset (CLL), the global accuracy (acc_G), the mean accuracy (acc_M), the learning time (time),the treewidth (tw) and the treewidth of the pruned graph (tw–pr) are shown. The optimal results are denoted in boldface.

Fold	Method	CLL	acc_G	acc_M	time	tw	tw-pr
1	DGS	-6905.89	0.05	**0.986**	16.04	3	3
1	DGS-clp	-6902.71	0.05	**0.986**	16.04	3	3
1	GS-tw	-6898.37	0.05	**0.986**	**8.5**	3	3
1	GS-clp	-6894.58	0.05	**0.986**	**8.5**	3	3
1	GS-pruned	**-6876.6**	**0.066**	0.99	8.62	4	3
2	DGS	-6775.64	0.04	**0.986**	16.93	3	3
2	DGS-clp	-6769.52	0.04	**0.986**	16.93	3	3
2	GS-tw	-6776.23	0.05	**0.986**	**8.6**	3	3
2	GS-clp	-6769.78	0.04	**0.986**	**8.6**	3	3
2	GS-pruned	**-6767.4**	**0.062**	0.99	8.78	4	3
3	DGS	-6845.91	0.03	0.99	16.61	3	3
3	DGS-clp	-6840.59	0.03	0.99	16.61	3	3
3	GS-tw	-6852.63	0.04	0.99	**8.7**	3	3
3	GS-clp	-6846.91	0.03	**0.986**	**8.7**	3	3
3	GS-pruned	**-6840.5**	**0.054**	0.99	8.71	4	3
4	DGS	-6933.33	0.04	0.99	16.12	3	3
4	DGS-clp	-6930.54	0.04	0.99	16.12	3	3
4	GS-tw	-6928.91	**0.057**	0.99	**8**	3	3
4	GS-clp	**-6925.9**	0.04	0.99	**8**	3	3
4	GS-pruned	-6927.49	0.05	**0.986**	8.19	5	3
5	DGS	-6956.92	0.03	0.99	17.41	3	3
5	DGS-clp	-6958.15	0.03	0.99	17.41	3	3
5	GS-tw	-6959.44	0.03	**0.986**	8.94	3	3
5	GS-clp	-6959.69	0.03	**0.986**	8.94	3	3
5	GS-pruned	**-6936.3**	**0.045**	0.99	**8.9**	5	3

Table 39: Comparison of the methods in dataset reutersk500 in 5-fold cross-validation, using a treewidth bound of 4. For each fold and method, the conditional log-likelihood in the test dataset (CLL), the global accuracy (acc_G), the mean accuracy (acc_M), the learning time (time),the treewidth (tw) and the treewidth of the pruned graph (tw–pr) are shown. The optimal results are denoted in boldface.

Fold	Method	CLL	acc_G	acc_M	time	tw	tw-pr
1	DGS	-6829.29	0.06	0.99	16.7	4	4
1	DGS-clp	-6827.11	0.07	0.99	16.7	4	4
1	GS-tw	-6829.82	0.05	0.99	**8.8**	4	4
1	GS-clp	-6826.43	0.05	**0.986**	**8.8**	4	4
1	GS-pruned	**-6818.5**	**0.072**	0.99	8.88	5	4
2	DGS	-6720.48	0.08	0.99	17.38	4	4
2	DGS-clp	-6719.38	0.06	0.99	17.38	4	4
2	GS-tw	-6708.65	**0.084**	**0.986**	**8.7**	4	4
2	GS-clp	**-6703.2**	0.07	**0.986**	**8.7**	4	4
2	GS-pruned	-6703.77	0.06	**0.986**	8.96	5	4
3	DGS	-6766.23	0.08	0.99	17.27	4	4
3	DGS-clp	-6767.42	0.06	0.99	17.27	4	4
3	GS-tw	-6780.41	**0.081**	**0.986**	**8.8**	4	4
3	GS-clp	-6777.84	0.05	**0.986**	**8.8**	4	4
3	GS-pruned	**-6757.3**	0.06	0.99	9.01	5	4
4	DGS	-6889.86	0.07	0.99	16.67	4	4
4	DGS-clp	-6887.8	0.06	0.99	16.67	4	4
4	GS-tw	-6845.49	0.07	**0.986**	**8.5**	4	4
4	GS-clp	**-6841.5**	**0.074**	**0.986**	**8.5**	4	4
4	GS-pruned	-6844.63	0.06	0.99	8.63	5	4
5	DGS	-6875.33	**0.065**	0.99	18.19	4	4
5	DGS-clp	-6874.72	0.05	0.99	18.19	4	4
5	GS-tw	-6864.08	0.06	0.99	**9.2**	4	4
5	GS-clp	-6865.68	0.02	**0.986**	**9.2**	4	4
5	GS-pruned	**-6854.4**	0.06	0.99	9.37	5	4

Table 40: Comparison of the methods in dataset reutersk500 in 5-fold cross-validation, using a treewidth bound of 5. For each fold and method, the conditional log-likelihood in the test dataset (CLL), the global accuracy (acc_G), the mean accuracy (acc_M), the learning time (time),the treewidth (tw) and the treewidth of the pruned graph (tw–pr) are shown. The optimal results are denoted in boldface.

Fold	Method	CLL	acc_G	acc_M	time	tw	tw-pr
1	DGS	-6794.44	0.08	0.99	17.98	5	5
1	DGS-clp	**-6792.1**	0.08	**0.986**	17.98	5	5
1	GS-tw	-6801.82	0.08	**0.986**	**9.1**	5	5
1	GS-clp	-6801.04	**0.087**	**0.986**	**9.1**	5	5
1	GS-pruned	-6801.82	0.08	**0.986**	9.13	5	5
2	DGS	-6660.87	**0.076**	0.99	18.34	5	5
2	DGS-clp	-6659.51	0.06	0.99	18.34	5	5
2	GS-tw	-6649.62	0.07	**0.986**	**8.9**	5	5
2	GS-clp	**-6644.4**	0.07	**0.986**	**8.9**	5	5
2	GS-pruned	-6655.26	0.07	0.99	8.94	6	5
3	DGS	**-6719.4**	**0.075**	**0.986**	18.24	5	5
3	DGS-clp	-6720.43	0.04	**0.986**	18.24	5	5
3	GS-tw	-6739.97	0.06	0.99	9.21	5	5
3	GS-clp	-6738.14	0.06	0.99	9.21	5	5
3	GS-pruned	-6739.97	0.06	0.99	**9.2**	5	5
4	DGS	-6833.36	0.07	0.99	17.5	5	5
4	DGS-clp	-6831.15	0.06	0.99	17.5	5	5
4	GS-tw	-6806.98	**0.074**	**0.986**	**8.7**	5	5
4	GS-clp	**-6803**	**0.074**	0.99	**8.7**	5	5
4	GS-pruned	-6812.67	0.06	**0.986**	8.85	6	5
5	DGS	-6834.56	**0.065**	0.99	19.16	5	5
5	DGS-clp	-6833.87	0.05	**0.986**	19.16	5	5
5	GS-tw	**-6827.5**	0.05	**0.986**	**9.7**	5	5
5	GS-clp	-6828.42	0.05	**0.986**	**9.7**	5	5
5	GS-pruned	**-6827.5**	0.05	**0.986**	9.72	5	5

Table 41: Comparison of the methods in dataset mediamill in 5-fold cross-validation, using a treewidth bound of 2. For each fold and method, the conditional log-likelihood in the test dataset (CLL), the global accuracy (acc_G), the mean accuracy (acc_M), the learning time (time),the treewidth (tw) and the treewidth of the pruned graph (tw–pr) are shown. The optimal results are denoted in boldface.

Fold	Method	CLL	acc_G	acc_M	time	tw	tw-pr
1	DGS	-63335.47	**0.091**	0.97	661.77	2	2
1	DGS-clp	**-63004.6**	0.09	**0.967**	661.77	2	2
1	GS-tw	-230702.76	0.04	0.96	**13.5**	2	2
1	GS-clp	-66996.52	0.08	0.97	**13.5**	2	2
1	GS-pruned	-65127.5	0.07	0.97	23.72	35	2
2	DGS	-62152.82	0.09	0.97	619.41	2	2
2	DGS-clp	**-61765.1**	**0.091**	**0.968**	619.41	2	2
2	GS-tw	-225868.26	0.04	0.96	**13.7**	2	2
2	GS-clp	-70425.73	0.07	0.97	**13.7**	2	2
2	GS-pruned	-64141.2	0.08	0.97	23.48	42	2
3	DGS	-63169.85	**0.084**	0.97	606.22	2	2
3	DGS-clp	**-62675.5**	0.08	**0.968**	606.22	2	2
3	GS-tw	-230041.11	0.04	0.96	**13.6**	2	2
3	GS-clp	-70842.95	0.07	0.97	**13.6**	2	2
3	GS-pruned	-64703.39	0.07	0.97	23.59	45	2
4	DGS	-63369.16	**0.074**	0.97	630.16	2	2
4	DGS-clp	**-63015.2**	0.07	**0.968**	630.16	2	2
4	GS-tw	-230803.25	0.03	0.96	**13.8**	2	2
4	GS-clp	-66036.85	0.07	0.97	**13.8**	2	2
4	GS-pruned	-65069.46	0.07	0.97	23.54	42	2
5	DGS	-63703.38	**0.084**	0.97	652.26	2	2
5	DGS-clp	**-63230**	0.08	**0.968**	652.26	2	2
5	GS-tw	-230562.66	0.04	0.96	**14.2**	2	2
5	GS-clp	-65908.34	0.08	0.97	**14.2**	2	2
5	GS-pruned	-65745.22	0.07	0.97	23.69	37	2

Table 42: Comparison of the methods in dataset mediamill in 5-fold cross-validation, using a treewidth bound of 3. For each fold and method, the conditional log-likelihood in the test dataset (CLL), the global accuracy (acc_G), the mean accuracy (acc_M), the learning time (time),the treewidth (tw) and the treewidth of the pruned graph (tw–pr) are shown. The optimal results are denoted in boldface.

Fold	Method	CLL	acc_G	acc_M	time	tw	tw-pr
1	DGS	-61521.56	**0.095**	0.97	986.28	3	3
1	DGS-clp	**-61239.4**	0.09	**0.968**	986.28	3	3
1	GS-tw	-260184.35	0.03	0.96	**17.7**	3	3
1	GS-clp	-70348.16	0.08	0.97	**17.7**	3	3
1	GS-pruned	-62980.4	0.08	0.97	28.95	38	3
2	DGS	-61091.35	**0.095**	0.97	893.15	3	3
2	DGS-clp	**-60783**	0.09	**0.968**	893.15	3	3
2	GS-tw	-260044.28	0.04	0.96	**17.4**	3	3
2	GS-clp	-137287.94	0.03	0.96	**17.4**	3	3
2	GS-pruned	-62803.99	0.07	0.97	29.8	37	3
3	DGS	-61447.42	0.09	0.97	852.45	3	3
3	DGS-clp	**-60943.1**	**0.092**	**0.968**	852.45	3	3
3	GS-tw	-268497.53	0.03	0.96	**17.3**	3	3
3	GS-clp	-69728.8	0.08	0.97	**17.3**	3	3
3	GS-pruned	-62681.33	0.07	0.97	29.62	40	3
4	DGS	-61759.03	0.08	0.97	842.94	3	3
4	DGS-clp	**-61428.1**	**0.084**	**0.968**	842.94	3	3
4	GS-tw	-262699.9	0.04	0.96	**16.9**	3	3
4	GS-clp	-72954.53	0.07	0.97	**16.9**	3	3
4	GS-pruned	-62464.53	0.08	0.97	28.71	42	3
5	DGS	-62317.84	**0.086**	0.97	976.3	3	3
5	DGS-clp	**-61971.7**	0.08	**0.968**	976.3	3	3
5	GS-tw	-262344.27	0.04	0.96	**17.4**	3	3
5	GS-clp	-71138.28	0.07	0.97	**17.4**	3	3
5	GS-pruned	-62650.41	0.08	0.97	28.88	34	3

Table 43: Comparison of the methods in dataset mediamill in 5-fold cross-validation, using a treewidth bound of 4. For each fold and method, the conditional log-likelihood in the test dataset (CLL), the global accuracy (acc_G), the mean accuracy (acc_M), the learning time (time),the treewidth (tw) and the treewidth of the pruned graph (tw–pr) are shown. The optimal results are denoted in boldface.

Fold	Method	CLL	acc_G	acc_M	time	tw	tw-pr
1	DGS	-60934.34	**0.093**	0.97	1673.88	4	4
1	DGS-clp	**-60641.9**	0.09	**0.968**	1673.88	4	4
1	GS-tw	-261727.4	0.04	0.96	**20.9**	4	4
1	GS-clp	-144692.3	0.03	0.96	**20.9**	4	4
1	GS-pruned	-61661.65	0.08	0.97	33.84	40	4
2	DGS	-59978.94	**0.09**	0.97	1145.26	4	4
2	DGS-clp	**-59649.4**	0.09	**0.968**	1145.26	4	4
2	GS-tw	-258541.44	0.04	0.96	**21.3**	4	4
2	GS-clp	-165912.91	0.03	0.96	**21.3**	4	4
2	GS-pruned	-61737.62	0.08	0.97	33.92	36	4
3	DGS	-60469.24	0.09	0.97	1193.82	4	4
3	DGS-clp	**-60029.9**	0.09	0.97	1193.82	4	4
3	GS-tw	-264572.27	0.04	0.96	**21**	4	4
3	GS-clp	-64719.1	**0.093**	**0.968**	**21**	4	4
3	GS-pruned	-61631.92	0.09	0.97	33.8	40	4
4	DGS	-60310.1	**0.085**	0.97	1274.16	4	4
4	DGS-clp	**-59959.1**	0.08	**0.968**	1274.16	4	4
4	GS-tw	-272078.14	0.04	0.96	**20.8**	4	4
4	GS-clp	-155287.25	0.03	0.96	**20.8**	4	4
4	GS-pruned	-61270.81	0.08	0.97	33.8	37	4
5	DGS	-60978.42	**0.088**	0.97	1407.1	4	4
5	DGS-clp	**-60532.4**	0.08	0.97	1407.1	4	4
5	GS-tw	-262981.07	0.04	0.96	**20.7**	4	4
5	GS-clp	-67988.49	**0.088**	**0.968**	**20.7**	4	4
5	GS-pruned	-61992.07	0.08	0.97	33.41	42	4

Table 44: Comparison of the methods in dataset mediamill in 5-fold cross-validation, using a treewidth bound of 5. For each fold and method, the conditional log-likelihood in the test dataset (CLL), the global accuracy (acc_G), the mean accuracy (acc_M), the learning time (time),the treewidth (tw) and the treewidth of the pruned graph (tw–pr) are shown. The optimal results are denoted in boldface.

Fold	Method	CLL	acc_G	acc_M	time	tw	tw-pr
1	DGS	-60371.47	0.09	0.97	2502.95	5	5
1	DGS-clp	**-60028.3**	**0.091**	0.97	2502.95	5	5
1	GS-tw	-90368.71	0.06	0.96	**30**	5	5
1	GS-clp	-60294.09	0.08	**0.968**	**30**	5	5
1	GS-pruned	-61429.4	0.07	0.97	34.45	44	5
2	DGS	-59653.79	0.09	0.97	1918.17	5	5
2	DGS-clp	**-59340.9**	0.09	0.97	1918.17	5	5
2	GS-tw	-102520.34	0.06	0.96	**29.3**	5	5
2	GS-clp	-65278.33	**0.093**	**0.968**	**29.3**	5	5
2	GS-pruned	-61258.64	0.08	0.97	33.61	41	5
3	DGS	-60021.5	0.09	0.97	2302.43	5	5
3	DGS-clp	**-59558.9**	0.09	0.97	2302.43	5	5
3	GS-tw	-95421.69	0.07	0.96	**30.2**	5	5
3	GS-clp	-60433.8	**0.095**	**0.968**	**30.2**	5	5
3	GS-pruned	-61086.39	0.07	0.97	35.33	41	5
4	DGS	-60096.82	0.09	0.97	1970.78	5	5
4	DGS-clp	**-59788.2**	0.08	0.97	1970.78	5	5
4	GS-tw	-93889.54	0.06	0.96	**29.3**	5	5
4	GS-clp	-60794.68	**0.095**	**0.968**	**29.3**	5	5
4	GS-pruned	-61700.14	0.08	0.97	33.92	43	5
5	DGS	-60381.59	0.09	0.97	2380.98	5	5
5	DGS-clp	**-59976.4**	**0.095**	0.97	2380.98	5	5
5	GS-tw	-92636.48	0.07	0.96	**29.7**	5	5
5	GS-clp	-61024.52	0.09	**0.968**	**29.7**	5	5
5	GS-pruned	-61922.54	0.08	0.97	33.61	40	5

Table 45: Comparison of the methods in dataset corel5k in 5-fold cross-validation, using a treewidth bound of 2. For each fold and method, the conditional log-likelihood in the test dataset (CLL), the global accuracy (acc_G), the mean accuracy (acc_M), the learning time (time),the treewidth (tw) and the treewidth of the pruned graph (tw–pr) are shown. The optimal results are denoted in boldface.

Fold	Method	CLL	acc_G	acc_M	time	tw	tw-pr
1	DGS	-12888.47	0	0.99	254.62	2	2
1	DGS-clp	**-12862**	0	**0.99**	254.62	2	2
1	GS-tw	-12982.03	**0.007**	0.99	**98.5**	2	2
1	GS-clp	-12937.48	**0.007**	0.99	**98.5**	2	2
1	GS-pruned	-12970.06	0	0.99	119.03	42	2
2	DGS	-12738.84	0.01	0.99	260.18	2	2
2	DGS-clp	**-12716.7**	0.01	**0.99**	260.18	2	2
2	GS-tw	-12961.6	**0.009**	0.99	**97.7**	2	2
2	GS-clp	-12924.43	**0.009**	0.99	**97.7**	2	2
2	GS-pruned	-12934.12	0.01	0.99	119.27	58	2
3	DGS	-12852.12	0.01	0.99	241.69	2	2
3	DGS-clp	**-12834.5**	0.01	**0.99**	241.69	2	2
3	GS-tw	-12899.4	**0.014**	0.99	**100.1**	2	2
3	GS-clp	-12869.72	**0.014**	0.99	**100.1**	2	2
3	GS-pruned	-12890.29	0.01	0.99	119.93	45	2
4	DGS	-13033.48	0	0.99	241.61	2	2
4	DGS-clp	-13008.65	0	**0.99**	241.61	2	2
4	GS-tw	-13030.36	**0.012**	0.99	**97.3**	2	2
4	GS-clp	**-12994**	0.01	0.99	**97.3**	2	2
4	GS-pruned	-13014.81	0.01	0.99	120.77	40	2
5	DGS	-12910.67	0.02	0.99	253.19	2	2
5	DGS-clp	**-12882.5**	0.02	**0.991**	253.19	2	2
5	GS-tw	-12972.62	**0.02**	0.99	**98.7**	2	2
5	GS-clp	-12936.61	**0.02**	0.99	**98.7**	2	2
5	GS-pruned	-12950.17	0.02	0.99	127.47	51	2

Table 46: Comparison of the methods in dataset corel5k in 5-fold cross-validation, using a treewidth bound of 3. For each fold and method, the conditional log-likelihood in the test dataset (CLL), the global accuracy (acc_G), the mean accuracy (acc_M), the learning time (time),the treewidth (tw) and the treewidth of the pruned graph (tw–pr) are shown. The optimal results are denoted in boldface.

Fold	Method	CLL	acc_G	acc_M	time	tw	tw-pr
1	DGS	-12767.68	0	0.99	248.38	3	3
1	DGS-clp	**-12740.9**	0	**0.99**	248.38	3	3
1	GS-tw	-12831.43	**0.006**	0.99	**113.4**	3	3
1	GS-clp	-12792.95	**0.006**	0.99	**113.4**	3	3
1	GS-pruned	-12837.21	**0.006**	0.99	124.83	44	3
2	DGS	-12697.59	0.01	0.99	262.58	3	3
2	DGS-clp	**-12674.1**	**0.008**	**0.99**	262.58	3	3
2	GS-tw	-12827.13	0.01	0.99	**111.1**	3	3
2	GS-clp	-12791.64	0.01	0.99	**111.1**	3	3
2	GS-pruned	-12832.62	**0.008**	0.99	133.28	52	3
3	DGS	-12738.77	0.01	0.99	249.18	3	3
3	DGS-clp	**-12719.4**	0.01	0.99	249.18	3	3
3	GS-tw	-12760.2	**0.016**	0.99	**111.2**	3	3
3	GS-clp	-12731.13	0.02	**0.99**	**111.2**	3	3
3	GS-pruned	-12795.29	0.01	0.99	128.75	51	3
4	DGS	-12979.8	0	0.99	254.93	3	3
4	DGS-clp	-12955.87	0	**0.99**	254.93	3	3
4	GS-tw	-12904.04	**0.011**	0.99	**107.7**	3	3
4	GS-clp	**-12870.2**	**0.011**	0.99	**107.7**	3	3
4	GS-pruned	-12934.33	**0.011**	0.99	127.05	48	3
5	DGS	-12803.18	**0.021**	0.99	263.84	3	3
5	DGS-clp	**-12775.1**	0.02	**0.991**	263.84	3	3
5	GS-tw	-12832.31	**0.021**	0.99	**108.6**	3	3
5	GS-clp	-12797.31	0.02	0.99	**108.6**	3	3
5	GS-pruned	-12817.6	0.02	0.99	124.77	55	3

Table 47: Comparison of the methods in dataset corel5k in 5-fold cross-validation, using a treewidth bound of 4. For each fold and method, the conditional log-likelihood in the test dataset (CLL), the global accuracy (acc_G), the mean accuracy (acc_M), the learning time (time),the treewidth (tw) and the treewidth of the pruned graph (tw–pr) are shown. The optimal results are denoted in boldface.

Fold	Method	CLL	acc_G	acc_M	time	tw	tw-pr
1	DGS	-12721.19	0	0.99	271.93	4	4
1	DGS-clp	**-12693.1**	0	**0.99**	271.93	4	4
1	GS-tw	-12800.96	0.01	0.99	**113.8**	4	4
1	GS-clp	-12760.81	0.01	0.99	**113.8**	4	4
1	GS-pruned	-12830.52	**0.008**	0.99	131.04	46	4
2	DGS	-12651.61	0.01	0.99	271.98	4	4
2	DGS-clp	**-12628.4**	0.01	**0.99**	271.98	4	4
2	GS-tw	-12779.1	0.01	0.99	**112.2**	4	4
2	GS-clp	-12743.09	0.01	0.99	**112.2**	4	4
2	GS-pruned	-12778.24	**0.01**	0.99	130.39	56	4
3	DGS	-12652.39	0.01	0.99	275.77	4	4
3	DGS-clp	**-12635.2**	0.01	**0.99**	275.77	4	4
3	GS-tw	-12674.03	**0.016**	0.99	**113.3**	4	4
3	GS-clp	-12646.15	0.02	0.99	**113.3**	4	4
3	GS-pruned	-12706.9	0.01	0.99	130.27	53	4
4	DGS	-12912.24	0	0.99	305.56	4	4
4	DGS-clp	-12889.31	0	**0.99**	305.56	4	4
4	GS-tw	-12809.5	0.01	0.99	**110.4**	4	4
4	GS-clp	**-12779.5**	0.01	0.99	**110.4**	4	4
4	GS-pruned	-12836.54	**0.011**	0.99	128.42	47	4
5	DGS	-12750.36	0.02	0.99	304.35	4	4
5	DGS-clp	**-12721.7**	0.02	**0.99**	304.35	4	4
5	GS-tw	-12793.31	**0.022**	0.99	**109.5**	4	4
5	GS-clp	-12759.07	0.02	0.99	**109.5**	4	4
5	GS-pruned	-12785.62	0.02	0.99	129	56	4

Table 48: Comparison of the methods in dataset corel5k in 5-fold cross-validation, using a treewidth bound of 5. For each fold and method, the conditional log-likelihood in the test dataset (CLL), the global accuracy (acc_G), the mean accuracy (acc_M), the learning time (time),the treewidth (tw) and the treewidth of the pruned graph (tw–pr) are shown. The optimal results are denoted in boldface.

Fold	Method	CLL	acc_G	acc_M	time	tw	tw-pr
1	DGS	-12728.1	0	0.99	305.44	5	5
1	DGS-clp	**-12699.6**	0	**0.99**	305.44	5	5
1	GS-tw	-12824.47	0.01	0.99	**115.2**	5	5
1	GS-clp	-12787.43	0.01	0.99	**115.2**	5	5
1	GS-pruned	-12832.04	**0.008**	0.99	139.98	51	5
2	DGS	-12635.71	0.01	0.99	322.18	5	5
2	DGS-clp	**-12613.1**	0.01	**0.99**	322.18	5	5
2	GS-tw	-12774.04	0.01	0.99	**114.4**	5	5
2	GS-clp	-12737.61	0.01	0.99	**114.4**	5	5
2	GS-pruned	-12783.79	**0.012**	0.99	143.67	52	5
3	DGS	-12641.14	0.01	0.99	315.76	5	5
3	DGS-clp	-12623.01	0.01	**0.991**	315.76	5	5
3	GS-tw	-12649.94	**0.019**	0.99	**121**	5	5
3	GS-clp	**-12620.7**	0.02	0.99	**121**	5	5
3	GS-pruned	-12685.71	0.01	0.99	145.14	47	5
4	DGS	-12875.75	0.01	0.99	304.58	5	5
4	DGS-clp	-12852.74	0.01	**0.99**	304.58	5	5
4	GS-tw	-12806.13	0.01	0.99	**123**	5	5
4	GS-clp	**-12777.3**	0.01	0.99	**123**	5	5
4	GS-pruned	-12835.98	**0.011**	0.99	143.36	44	5
5	DGS	-12706.61	0.02	0.99	292.79	5	5
5	DGS-clp	**-12677.9**	0.02	**0.991**	292.79	5	5
5	GS-tw	-12803.46	0.02	0.99	**121.2**	5	5
5	GS-clp	-12765.85	0.02	0.99	**121.2**	5	5
5	GS-pruned	-12776.74	**0.021**	0.99	159.4	54	5

Table 49: Comparison of the methods in dataset tmc2007_500 in 5-fold cross-validation, using a treewidth bound of 2. For each fold and method, the conditional log-likelihood in the test dataset (CLL), the global accuracy (acc_G), the mean accuracy (acc_M), the learning time (time),the treewidth (tw) and the treewidth of the pruned graph (tw–pr) are shown. The optimal results are denoted in boldface.

Fold	Method	CLL	acc_G	acc_M	time	tw	tw-pr
1	DGS	-20250.13	0.26	0.93	612.09	2	2
1	DGS-clp	**-20063.4**	**0.265**	0.93	612.09	2	2
1	GS-tw	-28030.39	0.24	0.93	**55.7**	2	2
1	GS-clp	-20628.18	0.25	**0.935**	**55.7**	2	2
1	GS-pruned	-21116.28	0.26	0.93	102.67	74	2
2	DGS	-20244.04	0.26	0.93	546.33	2	2
2	DGS-clp	**-20055.8**	0.26	0.93	546.33	2	2
2	GS-tw	-27084.77	0.24	0.93	**54**	2	2
2	GS-clp	-21603.03	0.26	0.93	**54**	2	2
2	GS-pruned	-20496.28	**0.266**	**0.935**	101.32	62	2
3	DGS	-19863.35	0.26	0.94	591.37	2	2
3	DGS-clp	**-19587.1**	0.26	0.94	591.37	2	2
3	GS-tw	-26223.62	0.25	0.93	**54.5**	2	2
3	GS-clp	-19811.79	**0.271**	0.94	**54.5**	2	2
3	GS-pruned	-20218.88	0.27	**0.936**	103.64	66	2
4	DGS	-20191.89	**0.279**	0.94	605.42	2	2
4	DGS-clp	**-19797.8**	0.28	0.94	605.42	2	2
4	GS-tw	-28104.55	0.24	0.93	**54.4**	2	2
4	GS-clp	-20240.57	0.27	**0.935**	**54.4**	2	2
4	GS-pruned	-21134.37	0.26	0.93	101.45	62	2
5	DGS	-20167.57	0.26	0.93	593.13	2	2
5	DGS-clp	**-19950**	**0.266**	**0.934**	593.13	2	2
5	GS-tw	-27389.33	0.22	0.93	**54.5**	2	2
5	GS-clp	-21832.16	0.22	0.93	**54.5**	2	2
5	GS-pruned	-20851.24	0.24	0.93	106.29	64	2

Table 50: Comparison of the methods in dataset tmc2007_500 in 5-fold cross-validation, using a treewidth bound of 3. For each fold and method, the conditional log-likelihood in the test dataset (CLL), the global accuracy (acc_G), the mean accuracy (acc_M), the learning time (time),the treewidth (tw) and the treewidth of the pruned graph (tw–pr) are shown. The optimal results are denoted in boldface.

Fold	Method	CLL	acc_G	acc_M	time	tw	tw-pr
1	DGS	-19944.63	0.27	0.94	881.13	3	3
1	DGS-clp	**-19771**	0.27	0.93	881.13	3	3
1	GS-tw	-26100.14	0.24	0.93	**75.1**	3	3
1	GS-clp	-20302.07	0.27	0.93	**75.1**	3	3
1	GS-pruned	-20768.92	**0.272**	**0.936**	110.03	59	3
2	DGS	-19857.24	0.28	0.93	840.87	3	3
2	DGS-clp	**-19683.9**	0.28	0.94	840.87	3	3
2	GS-tw	-25537.51	0.27	0.93	**74.1**	3	3
2	GS-clp	-20127.96	0.29	0.94	**74.1**	3	3
2	GS-pruned	-20455.26	**0.293**	**0.938**	112.16	54	3
3	DGS	-19555.06	0.28	0.94	816.24	3	3
3	DGS-clp	**-19320.8**	0.28	0.94	816.24	3	3
3	GS-tw	-24578.89	0.26	0.93	**74.3**	3	3
3	GS-clp	-21347.79	0.22	0.93	**74.3**	3	3
3	GS-pruned	-20002.24	**0.284**	**0.938**	112.05	59	3
4	DGS	-19865.92	**0.286**	0.94	838.1	3	3
4	DGS-clp	**-19471.1**	0.29	0.94	838.1	3	3
4	GS-tw	-26518.1	0.26	0.93	**74.2**	3	3
4	GS-clp	-19626.01	**0.286**	**0.937**	**74.2**	3	3
4	GS-pruned	-21013.55	0.27	0.94	109.68	56	3
5	DGS	-19806.17	0.28	0.93	860.03	3	3
5	DGS-clp	-19609.32	0.28	0.94	860.03	3	3
5	GS-tw	-25099.09	0.25	0.93	**76**	3	3
5	GS-clp	**-19451.6**	**0.282**	**0.937**	**76**	3	3
5	GS-pruned	-20521.63	0.27	0.94	110.38	61	3

Table 51: Comparison of the methods in dataset tmc2007_500 in 5-fold cross-validation, using a treewidth bound of 4. For each fold and method, the conditional log-likelihood in the test dataset (CLL), the global accuracy (acc_G), the mean accuracy (acc_M), the learning time (time),the treewidth (tw) and the treewidth of the pruned graph (tw–pr) are shown. The optimal results are denoted in boldface.

Fold	Method	CLL	acc_G	acc_M	time	tw	tw-pr
1	DGS	-19785.19	0.27	0.93	1104.03	4	4
1	DGS-clp	**-19580.8**	0.26	0.94	1104.03	4	4
1	GS-tw	-24785.8	0.25	0.93	**87.9**	4	4
1	GS-clp	-20132.67	**0.285**	**0.937**	**87.9**	4	4
1	GS-pruned	-21042.06	0.27	0.94	112.29	63	4
2	DGS	-19804.44	0.28	0.94	1120.51	4	4
2	DGS-clp	**-19626.6**	0.29	0.94	1120.51	4	4
2	GS-tw	-24063.92	0.27	0.93	**88.2**	4	4
2	GS-clp	-19979.22	**0.295**	**0.938**	**88.2**	4	4
2	GS-pruned	-20619.86	0.29	0.94	112.54	51	4
3	DGS	-19304.48	0.28	0.94	1080.47	4	4
3	DGS-clp	**-19045**	0.28	0.94	1080.47	4	4
3	GS-tw	-23033.78	0.28	0.94	**89.1**	4	4
3	GS-clp	-19063.55	**0.297**	**0.939**	**89.1**	4	4
3	GS-pruned	-20042.36	0.29	0.94	114.89	60	4
4	DGS	-19613.78	**0.286**	0.94	1197.77	4	4
4	DGS-clp	**-19422.6**	0.28	**0.936**	1197.77	4	4
4	GS-tw	-24891.71	0.26	0.93	**87.3**	4	4
4	GS-clp	-20134.32	0.28	0.94	**87.3**	4	4
4	GS-pruned	-21046.37	0.28	0.94	111.19	62	4
5	DGS	-19580.98	0.28	0.93	1156.26	4	4
5	DGS-clp	**-19388.2**	0.28	0.94	1156.26	4	4
5	GS-tw	-23842.49	0.26	0.93	**88.7**	4	4
5	GS-clp	-20077.99	**0.284**	**0.936**	**88.7**	4	4
5	GS-pruned	-20602.67	0.28	0.94	112.8	60	4

Table 52: Comparison of the methods in dataset tmc2007_500 in 5-fold cross-validation, using a treewidth bound of 5. For each fold and method, the conditional log-likelihood in the test dataset (CLL), the global accuracy (acc_G), the mean accuracy (acc_M), the learning time (time),the treewidth (tw) and the treewidth of the pruned graph (tw–pr) are shown. The optimal results are denoted in boldface.

Fold	Method	CLL	acc_G	acc_M	time	tw	tw-pr
1	DGS	-19691.57	0.27	0.93	1611.95	5	5
1	DGS-clp	**-19498.3**	0.26	0.94	1611.95	5	5
1	GS-tw	-23431.19	0.27	0.93	**95**	5	5
1	GS-clp	-19586.56	**0.282**	**0.937**	**95**	5	5
1	GS-pruned	-20993.18	0.27	0.94	113.26	62	5
2	DGS	-19725.29	0.29	0.94	1488.23	5	5
2	DGS-clp	-19549.15	0.29	0.94	1488.23	5	5
2	GS-tw	-23068.58	0.27	0.94	**93.9**	5	5
2	GS-clp	**-19142.3**	**0.301**	**0.938**	**93.9**	5	5
2	GS-pruned	-20984.62	0.27	0.94	111.53	50	5
3	DGS	-19323.68	0.28	0.94	1380.7	5	5
3	DGS-clp	-19054.92	0.28	0.94	1380.7	5	5
3	GS-tw	-22342.69	0.28	0.94	**95.8**	5	5
3	GS-clp	**-19052.7**	**0.293**	**0.94**	**95.8**	5	5
3	GS-pruned	-20419.94	0.29	0.94	114.15	61	5
4	DGS	-19467.8	0.29	0.94	1699.84	5	5
4	DGS-clp	-19140.63	0.29	0.94	1699.84	5	5
4	GS-tw	-23616.57	0.28	0.93	**94.2**	5	5
4	GS-clp	**-19068.1**	**0.307**	**0.939**	**94.2**	5	5
4	GS-pruned	-21111.88	0.29	0.94	112	53	5
5	DGS	-19647.84	0.28	0.93	1584.57	5	5
5	DGS-clp	-19448.1	0.28	0.94	1584.57	5	5
5	GS-tw	-22894.14	0.27	0.93	**96.9**	5	5
5	GS-clp	**-19252.1**	**0.288**	**0.938**	**96.9**	5	5
5	GS-pruned	-20876.97	0.27	0.94	114.3	58	5

Table 53: Comparison of the methods in dataset bibtex in 5-fold cross-validation, using a treewidth bound of 2. For each fold and method, the conditional log-likelihood in the test dataset (CLL), the global accuracy (acc_G), the mean accuracy (acc_M), the learning time (time),the treewidth (tw) and the treewidth of the pruned graph (tw–pr) are shown. The optimal results are denoted in boldface.

Fold	Method	CLL	acc_G	acc_M	time	tw	tw-pr
1	DGS	-10668.67	0.17	0.99	3195.46	2	2
1	DGS-clp	**-10622.9**	**0.166**	0.99	3195.46	2	2
1	GS-tw	-13425.81	0.15	0.98	**1298.6**	2	2
1	GS-clp	-10845.99	0.16	**0.987**	**1298.6**	2	2
1	GS-pruned	-11299.4	0.16	0.99	2227.37	157	2
2	DGS	-10821.1	0.16	0.99	3222.08	2	2
2	DGS-clp	**-10761.2**	0.16	0.99	3222.08	2	2
2	GS-tw	-12858.09	0.16	0.99	**1413.9**	2	2
2	GS-clp	-10772.04	0.17	**0.987**	**1413.9**	2	2
2	GS-pruned	-11240.62	**0.176**	0.99	2222.64	157	2
3	DGS	-10702.02	0.16	0.99	3074.02	2	2
3	DGS-clp	**-10642.5**	0.16	0.99	3074.02	2	2
3	GS-tw	-13169.12	0.15	0.99	**1401.5**	2	2
3	GS-clp	-10738.04	0.17	**0.988**	**1401.5**	2	2
3	GS-pruned	-11108.49	**0.17**	0.99	2112.64	168	2
4	DGS	-10542.38	0.16	0.99	3008.42	2	2
4	DGS-clp	**-10485.6**	0.16	0.99	3008.42	2	2
4	GS-tw	-12769.65	0.17	0.99	**1437.6**	2	2
4	GS-clp	-10674.65	0.18	**0.987**	**1437.6**	2	2
4	GS-pruned	-10871.39	**0.183**	0.99	2108.82	170	2
5	DGS	-10668.06	0.15	0.99	2999.46	2	2
5	DGS-clp	**-10609.3**	0.15	0.99	2999.46	2	2
5	GS-tw	-13374.59	0.14	0.98	**1454**	2	2
5	GS-clp	-10689.19	**0.159**	**0.987**	**1454**	2	2
5	GS-pruned	-11352.09	0.15	0.99	2165.53	173	2

Table 54: Comparison of the methods in dataset bibtex in 5-fold cross-validation, using a treewidth bound of 3. For each fold and method, the conditional log-likelihood in the test dataset (CLL), the global accuracy (acc_G), the mean accuracy (acc_M), the learning time (time),the treewidth (tw) and the treewidth of the pruned graph (tw–pr) are shown. The optimal results are denoted in boldface.

Fold	Method	CLL	acc_G	acc_M	time	tw	tw-pr
1	DGS	-10659.93	0.17	0.99	3603.34	3	3
1	DGS-clp	**-10610.8**	0.16	0.99	3603.34	3	3
1	GS-tw	-13031.31	0.15	0.98	**1659.8**	3	3
1	GS-clp	-10691.18	0.16	**0.987**	**1659.8**	3	3
1	GS-pruned	-11090.35	**0.17**	0.99	2252.57	161	3
2	DGS	-10793.71	0.16	0.99	3558.33	3	3
2	DGS-clp	-10738.01	0.16	0.99	3558.33	3	3
2	GS-tw	-12384.95	0.16	0.99	**1695.3**	3	3
2	GS-clp	**-10524.3**	0.17	**0.987**	**1695.3**	3	3
2	GS-pruned	-11093.07	**0.181**	0.99	2209.16	168	3
3	DGS	-10591.06	0.16	0.99	3458.82	3	3
3	DGS-clp	-10534.01	0.16	0.99	3458.82	3	3
3	GS-tw	-12785.68	0.16	0.99	**1612.8**	3	3
3	GS-clp	**-10455.9**	0.17	**0.988**	**1612.8**	3	3
3	GS-pruned	-11098.76	**0.169**	0.99	2166	161	3
4	DGS	-10467.39	0.16	0.99	3404.01	3	3
4	DGS-clp	**-10407**	0.16	0.99	3404.01	3	3
4	GS-tw	-12406.06	0.16	0.99	**1730.5**	3	3
4	GS-clp	-10573.98	0.18	**0.987**	**1730.5**	3	3
4	GS-pruned	-10869.41	**0.184**	0.99	2264.55	153	3
5	DGS	-10631.63	0.15	0.99	3331.59	3	3
5	DGS-clp	-10568.99	0.15	0.99	3331.59	3	3
5	GS-tw	-12640.94	0.16	0.99	**1724.1**	3	3
5	GS-clp	**-10345.3**	**0.169**	**0.987**	**1724.1**	3	3
5	GS-pruned	-11343.91	0.16	0.99	2241.75	163	3

Table 55: Comparison of the methods in dataset bibtex in 5-fold cross-validation, using a treewidth bound of 4. For each fold and method, the conditional log-likelihood in the test dataset (CLL), the global accuracy (acc_G), the mean accuracy (acc_M), the learning time (time),the treewidth (tw) and the treewidth of the pruned graph (tw–pr) are shown. The optimal results are denoted in boldface.

Fold	Method	CLL	acc_G	acc_M	time	tw	tw-pr
1	DGS	-10625.38	0.17	0.99	3984.99	4	4
1	DGS-clp	-10576.58	0.16	0.99	3984.99	4	4
1	GS-tw	-12030.82	**0.17**	0.99	**1795.5**	4	4
1	GS-clp	**-10475.5**	0.17	**0.987**	**1795.5**	4	4
1	GS-pruned	-11163.7	0.17	0.99	2344.13	154	4
2	DGS	-10752.18	0.16	0.99	4087.34	4	4
2	DGS-clp	-10696.34	0.16	0.99	4087.34	4	4
2	GS-tw	-11615.69	0.17	0.99	**1913.5**	4	4
2	GS-clp	**-10466.4**	0.18	**0.987**	**1913.5**	4	4
2	GS-pruned	-11044.28	**0.185**	0.99	2403.38	158	4
3	DGS	-10570.34	0.17	0.99	3782.72	4	4
3	DGS-clp	-10511.02	0.17	0.99	3782.72	4	4
3	GS-tw	-11871.06	0.17	0.99	**1873**	4	4
3	GS-clp	**-10475.6**	0.17	**0.988**	**1873**	4	4
3	GS-pruned	-11112.76	**0.17**	0.99	2351.94	183	4
4	DGS	-10434.02	0.16	0.99	4062.21	4	4
4	DGS-clp	-10374.54	0.16	0.99	4062.21	4	4
4	GS-tw	-11594.91	**0.185**	0.99	**1863.2**	4	4
4	GS-clp	**-10294.9**	0.18	**0.987**	**1863.2**	4	4
4	GS-pruned	-10837.86	0.18	0.99	2199.8	153	4
5	DGS	-10567.59	0.16	0.99	3686.44	4	4
5	DGS-clp	-10508.51	0.16	0.99	3686.44	4	4
5	GS-tw	-12038.81	**0.171**	0.99	**1868.8**	4	4
5	GS-clp	**-10340.3**	0.17	**0.987**	**1868.8**	4	4
5	GS-pruned	-11335.94	0.16	0.99	2360.88	171	4

Table 56: Comparison of the methods in dataset bibtex in 5-fold cross-validation, using a treewidth bound of 5. For each fold and method, the conditional log-likelihood in the test dataset (CLL), the global accuracy (acc_G), the mean accuracy (acc_M), the learning time (time),the treewidth (tw) and the treewidth of the pruned graph (tw–pr) are shown. The optimal results are denoted in boldface.

Fold	Method	CLL	acc_G	acc_M	time	tw	tw-pr
1	DGS	-10599.53	0.17	0.99	4141.01	5	5
1	DGS-clp	**-10550.3**	0.17	**0.987**	4141.01	5	5
1	GS-tw	-11909.28	0.17	0.99	**1886.9**	5	5
1	GS-clp	-11807.36	**0.172**	0.99	**1886.9**	5	5
1	GS-pruned	-11179.94	0.17	0.99	2349.92	167	5
2	DGS	-10723.1	0.16	0.99	4085.36	5	4
2	DGS-clp	**-10667.7**	0.16	0.99	4085.36	5	4
2	GS-tw	-11584.34	0.18	0.99	**1910.9**	5	5
2	GS-clp	-11503.89	0.17	0.99	**1910.9**	5	5
2	GS-pruned	-11029.72	**0.182**	**0.987**	2359.26	172	5
3	DGS	-10550.99	0.16	0.99	4087.37	5	5
3	DGS-clp	**-10491.7**	0.16	**0.987**	4087.37	5	5
3	GS-tw	-11680.54	0.17	0.99	**1979.9**	5	5
3	GS-clp	-11589.85	**0.168**	0.99	**1979.9**	5	5
3	GS-pruned	-11107.63	0.17	0.99	2376.38	184	5
4	DGS	-10424.31	0.16	0.99	4211.13	5	5
4	DGS-clp	**-10364.3**	0.16	**0.987**	4211.13	5	5
4	GS-tw	-11392.62	0.17	0.99	**1936.3**	5	5
4	GS-clp	-11299.44	0.17	0.99	**1936.3**	5	5
4	GS-pruned	-10837.48	**0.185**	0.99	2319.04	172	5
5	DGS	-10532.02	0.16	0.99	4130.05	5	4
5	DGS-clp	**-10473.5**	0.16	**0.987**	4130.05	5	4
5	GS-tw	-11974.16	**0.169**	0.99	**1995.7**	5	5
5	GS-clp	-11868.68	0.17	0.99	**1995.7**	5	5
5	GS-pruned	-11437.38	0.16	0.99	2284.55	172	5

Table 57: Comparison of the methods in dataset imdb in 5-fold cross-validation, using a treewidth bound of 2. For each fold and method, the conditional log-likelihood in the test dataset (CLL), the global accuracy (acc_G), the mean accuracy (acc_M), the learning time (time),the treewidth (tw) and the treewidth of the pruned graph (tw–pr) are shown. The optimal results are denoted in boldface.

Fold	Method	CLL	acc_G	acc_M	time	tw	tw-pr
1	DGS	-130004.63	0.11	0.93	1689.36	2	2
1	DGS-clp	**-129932.2**	0.11	**0.929**	1689.36	2	2
1	GS-tw	-131700.79	0.09	0.93	**383.9**	2	2
1	GS-clp	-131045.72	0.11	0.93	**383.9**	2	2
1	GS-pruned	-130185.53	**0.118**	0.93	824.91	147	2
2	DGS	-130559.47	0.11	0.93	1735.31	2	2
2	DGS-clp	**-130489.6**	0.11	0.93	1735.31	2	2
2	GS-tw	-132110.88	0.11	0.93	**394.8**	2	2
2	GS-clp	-131494.44	0.11	0.93	**394.8**	2	2
2	GS-pruned	-130732.96	**0.118**	**0.928**	803.65	133	2
3	DGS	-129531.21	0.06	0.93	1873.71	2	2
3	DGS-clp	**-129467.9**	0.11	0.93	1873.71	2	2
3	GS-tw	-131500.83	0.08	0.93	**390.9**	2	2
3	GS-clp	-130803.19	0.11	0.93	**390.9**	2	2
3	GS-pruned	-129653.49	**0.118**	**0.929**	820.19	144	2
4	DGS	-130982.75	0.11	0.93	1841.36	2	2
4	DGS-clp	**-130907.2**	0.11	**0.928**	1841.36	2	2
4	GS-tw	-133351.94	0.09	0.93	**399**	2	2
4	GS-clp	-132525.99	0.11	0.93	**399**	2	2
4	GS-pruned	-131302.48	**0.109**	0.93	846.24	152	2
5	DGS	-130113.36	0.11	0.93	1703.97	2	2
5	DGS-clp	**-130063.6**	0.1	**0.929**	1703.97	2	2
5	GS-tw	-132272.68	0.08	0.93	**396.3**	2	2
5	GS-clp	-131524.7	0.11	0.93	**396.3**	2	2
5	GS-pruned	-130542.74	**0.114**	0.93	833.14	141	2

Table 58: Comparison of the methods in dataset imdb in 5-fold cross-validation, using a treewidth bound of 3. For each fold and method, the conditional log-likelihood in the test dataset (CLL), the global accuracy (acc_G), the mean accuracy (acc_M), the learning time (time),the treewidth (tw) and the treewidth of the pruned graph (tw–pr) are shown. The optimal results are denoted in boldface.

Fold	Method	CLL	acc_G	acc_M	time	tw	tw-pr
1	DGS	-127954.11	0.11	0.93	2434.01	3	3
1	DGS-clp	**-127868.8**	0.11	0.93	2434.01	3	3
1	GS-tw	-128290.35	0.12	0.93	**535.4**	3	3
1	GS-clp	-127971.75	**0.117**	0.93	**535.4**	3	3
1	GS-pruned	-128035.66	0.12	**0.929**	848.91	160	3
2	DGS	-128517.17	0.12	0.93	2101.35	3	3
2	DGS-clp	**-128444.5**	0.12	**0.928**	2101.35	3	3
2	GS-tw	-128794.85	0.12	0.93	**552.8**	3	3
2	GS-clp	-128477.51	0.12	0.93	**552.8**	3	3
2	GS-pruned	-128606.61	**0.123**	0.93	812.61	128	3
3	DGS	-126950.48	0.12	0.93	2435.7	3	3
3	DGS-clp	**-126871.1**	0.12	**0.929**	2435.7	3	3
3	GS-tw	-127440.46	0.12	0.93	**564.8**	3	3
3	GS-clp	-127113.91	0.12	0.93	**564.8**	3	3
3	GS-pruned	-127059.64	**0.126**	0.93	832.76	134	3
4	DGS	-128693.12	0.11	0.93	2312.82	3	3
4	DGS-clp	**-128623.5**	0.11	**0.928**	2312.82	3	3
4	GS-tw	-129254.32	0.11	0.93	**531.4**	3	3
4	GS-clp	-128915.3	**0.111**	0.93	**531.4**	3	3
4	GS-pruned	-128954.35	0.11	0.93	860.87	154	3
5	DGS	-128273.41	0.11	0.93	2177.14	3	3
5	DGS-clp	**-128205.7**	0.11	**0.929**	2177.14	3	3
5	GS-tw	-128661.81	0.11	0.93	**534.7**	3	3
5	GS-clp	-128353.72	0.11	0.93	**534.7**	3	3
5	GS-pruned	-128508.74	**0.117**	0.93	840.93	137	3

Table 59: Comparison of the methods in dataset imdb in 5-fold cross-validation, using a treewidth bound of 4. For each fold and method, the conditional log-likelihood in the test dataset (CLL), the global accuracy (acc_G), the mean accuracy (acc_M), the learning time (time),the treewidth (tw) and the treewidth of the pruned graph (tw–pr) are shown. The optimal results are denoted in boldface.

Fold	Method	CLL	acc_G	acc_M	time	tw	tw-pr
1	DGS	-126593.67	0.12	0.93	2971.53	4	4
1	DGS-clp	-126478.99	**0.125**	0.93	2971.53	4	4
1	GS-tw	-126695.81	0.12	0.93	**591.2**	4	4
1	GS-clp	**-126443.4**	0.12	0.93	**591.2**	4	4
1	GS-pruned	-126716.17	0.12	**0.929**	846.6	139	4
2	DGS	-127786.02	0.12	0.93	2741.12	4	4
2	DGS-clp	-127719.93	0.12	**0.928**	2741.12	4	4
2	GS-tw	-127781.78	0.12	0.93	**591.4**	4	4
2	GS-clp	**-127566.5**	**0.122**	0.93	**591.4**	4	4
2	GS-pruned	-127860.67	0.12	0.93	816.94	142	4
3	DGS	-125785.55	0.12	0.93	2822.44	4	4
3	DGS-clp	**-125698**	**0.123**	**0.929**	2822.44	4	4
3	GS-tw	-126046.37	0.12	0.93	**605.3**	4	4
3	GS-clp	-125840.88	0.12	0.93	**605.3**	4	4
3	GS-pruned	-125959.52	0.12	0.93	848.1	147	4
4	DGS	-127045.18	0.11	0.93	3059.47	4	4
4	DGS-clp	**-126950.3**	0.12	**0.928**	3059.47	4	4
4	GS-tw	-127299.75	**0.118**	0.93	**606.5**	4	4
4	GS-clp	-126987.52	0.12	0.93	**606.5**	4	4
4	GS-pruned	-127236.8	0.12	0.93	859.36	137	4
5	DGS	-127021.17	0.12	0.93	2857.09	4	4
5	DGS-clp	**-126944.3**	**0.118**	**0.929**	2857.09	4	4
5	GS-tw	-127398.88	0.12	0.93	**598.7**	4	4
5	GS-clp	-127125.43	0.12	0.93	**598.7**	4	4
5	GS-pruned	-127246.2	0.12	0.93	857.86	153	4

Table 60: Comparison of the methods in dataset imdb in 5-fold cross-validation, using a treewidth bound of 5. For each fold and method, the conditional log-likelihood in the test dataset (CLL), the global accuracy (acc_G), the mean accuracy (acc_M), the learning time (time),the treewidth (tw) and the treewidth of the pruned graph (tw–pr) are shown. The optimal results are denoted in boldface.

Fold	Method	CLL	acc_G	acc_M	time	tw	tw-pr
1	DGS	-126123.47	0.12	0.93	3677.5	5	5
1	DGS-clp	-126031.13	**0.125**	**0.929**	3677.5	5	5
1	GS-tw	-126132.06	0.12	0.93	**658.5**	5	5
1	GS-clp	**-125895.8**	0.12	0.93	**658.5**	5	5
1	GS-pruned	-126097.03	0.12	0.93	879.83	141	5
2	DGS	-126800.73	0.12	0.93	3369.75	5	5
2	DGS-clp	-126715.08	0.12	**0.928**	3369.75	5	5
2	GS-tw	-126770.5	0.12	0.93	**638.1**	5	5
2	GS-clp	**-126598.4**	0.12	0.93	**638.1**	5	5
2	GS-pruned	-126820.89	**0.12**	0.93	835.69	134	5
3	DGS	-124402.12	0.12	0.93	3935.6	5	5
3	DGS-clp	**-124379.2**	**0.126**	**0.929**	3935.6	5	5
3	GS-tw	-124590.43	0.13	0.93	**673.5**	5	5
3	GS-clp	-124452.15	0.12	0.93	**673.5**	5	5
3	GS-pruned	-124662.1	0.12	0.93	854.26	152	5
4	DGS	-126101.27	0.12	0.93	3783.08	5	5
4	DGS-clp	-126009.97	0.12	**0.928**	3783.08	5	5
4	GS-tw	-126162.79	**0.121**	0.93	**669.1**	5	5
4	GS-clp	**-125892.6**	0.12	0.93	**669.1**	5	5
4	GS-pruned	-126195.54	0.12	0.93	887.45	148	5
5	DGS	-125751.19	0.12	0.93	3686.68	5	5
5	DGS-clp	**-125685.3**	**0.121**	**0.929**	3686.68	5	5
5	GS-tw	-125914.8	0.12	0.93	**658.2**	5	5
5	GS-clp	-125760.31	0.12	0.93	**658.2**	5	5
5	GS-pruned	-126091.93	0.12	0.93	876.82	138	5