Supplementary Materials: Nukplex: An Efficient Local Search Algorithm for Maximum K-Plex Problem

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1 Detail Results

For each instance, max represents the best size found and avg denotes the average size. When max=avg, we do not report avg. In the tables, the bold values denote the best solution obtained among all algorithms. We only report the results for which all algorithms fail to find the same best and average values. Tables 1-6 display the detailed results corresponding to Table 2 in the main paper.

2 Comparisons against MKPP Exact Algorithms on Some Additional Large Sparse Instances

To further verify the performance of our proposed algorithm, we select two sets of large sparse graphs from KpLeX-Gap [Wang *et al.*, 2023], which have been tested in many previous k-plex related studies [Gao *et al.*, 2018; Zhou *et al.*, 2021; Jiang *et al.*, 2021; Chang *et al.*, 2022; Wang *et al.*, 2023]. The first set is the Network-Repo benchmark, which contains 139 large sparse graphs with up to 5.87×10^7 vertices from the Network Data Repository[1] [Rossi and Ahmed, 2015]. The second set is the 10th-DIMACS benchmark, which contains 84 large sparse graphs with up to 5.09×10^7 vertices[2]. Previous works for the MKKP heuristic algorithms focus on solving some small k values (e.g., $k = 2, 3, 4, 5$), while in KpLeX-Gap [Wang *et al.*, 2023], the authors carry out experiments with $k = 2, 5, 10, 15, 20$. In our work, k is set to $2, 3, 4, 5, 10, 15, 20$, and thus we consider 1561 instances in total. The time limit of the two exact algorithms KpLeX-Gap and DiseMKP is set to 1800 seconds, whereas the cutoff time of Nukplex is set to 1000 seconds with random seeds from 1 to 10.

Tables 7-8 display the results of Nukplex, KpLeX-Gap, and DiseMKP. The results indicate that Nukplex, KpLeX-Gap, and DiseMKP are able to obtain the best solutions for 1559, 1521, and 1433 instances, respectively. Nukplex only fails to obtain the best solutions for 2 instances when using 10 different seed values. However, when using 100 different seed values, Nukplex successfully obtains the best solutions for these two instances as well. Furthermore, when using a single seed value of 1, Nukplex achieves the best solutions for 1553 out of the 1561 instances. These additional experimental results further validate the effectiveness of Nukplex.

[1] http://lcs.ios.ac.cn/caisw/Resource/realworld%20graphs.tar.gz

[2] https://networkrepository.com/dimacs10.php

References

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Instance	k	Nukplex max(avg)	DCCplex max(avg)	KLS max(avg)	Instance	k	Nukplex max(avg)	DCCplex max(avg)	KLS max(avg)
brock400_3	2	**31**(30.64)	30	**31**	brock800_3	3	**30**	**30**(29.98)	**30**
brock400_4	2	**33**	**33**(32.84)	**33**	C1000.9	3	**96(95.96)**	**96**(94.98)	**96**(95.94)
brock800_4	2	**26(25.96)**	**26**(25.6)	**26**(25.94)	C2000.5	3	**23**(22.5)	**23**(22.16)	**23(22.99)**
C1000.9	2	**82(81.98)**	**82**(81.88)	**82**(81.88)	C2000.9	3	**109(108.64)**	108(107.18)	**109**(107.85)
C2000.5	2	**20(19.78)**	**20**(19.68)	**20**(19.68)	C4000.5	3	**25(24)**	24(23.32)	24
C2000.9	2	**94(93.42)**	**94**(92.28)	93(92.06)	C500.9	3	**81**	**81**(80.82)	**81**
C4000.5	2	21(20.58)	**22**(20.92)	21	frb100-40	3	**156**(153.06)	**156(153.36)**	154(152.55)
frb100-40	2	**131(128.02)**	130(127.52)	129(127.6)	frb35-17-2	3	**55(54.32)**	**55**(54.02)	**55(54.32)**
frb40-19-1	2	**55**	**55**(54.28)	**55**	frb35-17-4	3	**57**	**57**(56.1)	**57**
frb40-19-3	2	**53**	**53**(52.92)	**53**(52.98)	frb35-17-5	3	**56**	**56**(55.8)	**56**
frb45-21-3	2	**60**	**60**(59.32)	**60**	frb40-19-1	3	**66**	**66**(65.7)	**66**
frb45-21-4	2	**61(60.98)**	**61**(60.16)	**61**(60.88)	frb40-19-2	3	**65**	**65**(64.92)	**65**
frb45-21-5	2	**59**	**59**(58.70)	**59**(58.98)	frb40-19-4	3	**63**	**63**(62.94)	**63**
frb50-23-1	2	**67**	**67**(66.24)	**67**	frb45-21-1	3	**71(70.9)**	**71**(70.06)	**71**(70.56)
frb50-23-2	2	**67(66.38)**	66	**67**(66.35)	frb45-21-2	3	**71**	**71**(70.46)	**71**
frb50-23-3	2	**65(64.82)**	**65**(64.04)	**65**(64.57)	frb45-21-3	3	**72(71.74)**	71(70.96)	**72**(71.32)
frb50-23-4	2	**67(66.02)**	66(65.98)	66	frb45-21-4	3	**73(72.4)**	**73**(71.9)	**73**(72.22)
frb50-23-5	2	**67(66.98)**	**67**(66.24)	**67**(66.9)	frb45-21-5	3	**71(70.74)**	**71**(69.94)	**71**(70.54)
frb53-24-1	2	**71**	**71**(70.88)	**71**(70.71)	frb50-23-1	3	**80(79.06)**	79(78.96)	79
frb53-24-2	2	**70**	**70**(69.96)	**70**	frb50-23-2	3	**79**	**79**(78.96)	**79**
frb53-24-3	2	**70**	**70**(69.84)	**70**	frb50-23-3	3	**77(76.4)**	76(75.80)	**77(76.4)**
frb53-24-4	2	**70(69.98)**	**70**(69)	**70**(69.68)	frb50-23-4	3	**79**	**79**(78.96)	**79**
frb53-24-5	2	**69(68.44)**	68	**69**(68.41)	frb50-23-5	3	**80(79.4)**	**80**(79.16)	**80**(79.38)
frb56-25-1	2	**75**	**75**(74.28)	**75**(74.47)	frb53-24-1	3	**85**	**85**(84.2)	**85**
frb56-25-2	2	**75**	**75**(74.48)	**75**(74.4)	frb53-24-2	3	**83(82.92)**	**83**(82.16)	**83**(82.91)
frb56-25-3	2	**74**	**74**(73.48)	**74**(73.66)	frb53-24-3	3	**84(83.18)**	83(82.9)	83
frb56-25-4	2	**74(73.98)**	**74**(72.96)	**74**(73.4)	frb53-24-4	3	**84(83.7)**	**84**(82.56)	**84**(83.69)
frb56-25-5	2	**74(73.98)**	**74**(73.1)	**74**(73.64)	frb53-24-5	3	**82**	**82**(81.52)	**82**(81.94)
frb59-26-1	2	**79(78.98)**	78	**79**(78.22)	frb56-25-1	3	**90(89.46)**	89(88.96)	89
frb59-26-2	2	**79(78.96)**	**79**(78.16)	**79**(78.3)	frb56-25-2	3	**89**	**89**(88.48)	**89**
frb59-26-3	2	**78(77.98)**	**78**(77.04)	**78**(77.28)	frb56-25-3	3	**88(87.92)**	**88**(87.1)	**88**(87.78)
frb59-26-4	2	**79(78.1)**	78(77.2)	78(77.44)	frb56-25-4	3	**88(87.66)**	**88**(86.66)	**88**(87.04)
frb59-26-5	2	**78**	**78**(77.92)	**78**(77.6)	frb56-25-5	3	**88(87.48)**	**88**(86.8)	**88**(87.46)
gen400_p0.9_55	2	**68(67.8)**	**68**(67.56)	**68**(67.76)	frb59-26-1	3	**94(93.44)**	93(92.64)	93
gen400_p0.9_65	2	**74**	**74**(73.08)	**74**	frb59-26-2	3	**94(93.66)**	**94**(92.86)	**94**(93.56)
gen400_p0.9_75	2	**80**	79	**80**(79.99)	frb59-26-3	3	**94(92.98)**	**94**(91.98)	**94**(92.70)
MANN_a27	2	**236**(235.96)	**236**	**236**(235.96)	frb59-26-4	3	**93(92.9)**	**93**(92.14)	**93**(92.76)
san1000	2	**18**(17.06)	**18**(17)	**18(17.28)**	frb59-26-5	3	**93(92.88)**	**93**(91.69)	**93**(92.58)
san200_0.7_2	2	**26**(25.4)	**26**	**26**(25.4)	keller6	3	**93**	**93**(91.46)	**93**
san400_0.5_1	2	**15**	**15**(14.86)	**15**	p_hat1500-3	3	**133**	**133**(132.98)	**133**
san400_0.7_1	2	**42**(41.14)	**42**(41.06)	**42**	san1000	3	**25**	**25**(24.96)	**25**
san400_0.7_2	2	**33(32.46)**	32(32)	**33**(32.07)	san200_0.7_1	3	**46**	**46**(45.94)	**46**
san400_0.7_3	2	**28**	**28**(27.02)	**28**(27.87)	san400_0.5_1	3	**22**	**22**(21.84)	**22**
san400_0.9_1	2	**103(102.98)**	**103**(102.12)	**103**(102.46)	san400_0.7_2	3	**47**(46.1)	**47**(46.22)	**47**
brock800_1	3	**30(29.9)**	**30**(29.32)	**30**(29.84)	san400_0.7_3	3	**39(38.36)**	**39**(38.02)	**39**(38.34)

Table 1: Experimental results of Nukplex, DCCplex and KLS on classic instances I. All algorithms are executed for 100 independent runs, with a cutoff time of 1000 seconds for each run.

Instance	k	Nukplex max(avg)	DCCplex max(avg)	KLS max(avg)	Instance	k	Nukplex max(avg)	DCCplex max(avg)	KLS max(avg)
brock800_1	4	**34**	**34**(33.88)	**34**	brock400_4	5	**46**	**46**(45.98)	**46**
brock800_2	4	**34**	**34**(33.06)	**34**	brock800_2	5	**38**	**38**(37.08)	**38**
brock800_3	4	**34**	**34**(33.78)	**34**	C1000.9	5	**122(121.26)**	121(119.88)	**122**(121.24)
brock800_4	4	**34**(33.08)	33	**34(33.98)**	C2000.5	5	28	28	**29(28.11)**
C1000.9	4	**110(109.28)**	109(107.96)	**110**(109.26)	C2000.9	5	**137(136.34)**	136(134.20)	**137**(136.01)
C2000.5	4	**26**(25.08)	25	**26(25.74)**	C4000.5	5	**30(29.94)**	**30**(29.08)	**30**(29.92)
C2000.9	4	**123(122.62)**	**123**(121.20)	**123**(122.02)	C500.9	5	**104(103.62)**	103(102.78)	**104**(103.56)
C4000.5	4	**28**(26.70)	27(26.08)	**28(27.02)**	c-fat200-2	5	**24**	**24**(23.99)	**24**
C500.9	4	**93(92.9)**	**93**(92.18)	**93(92.9)**	c-fat200-5	5	**58**	**58**(57.94)	**58**
c-fat200-5	4	**58**	**58**(57.94)	**58**	DSJC1000.5	5	**27**	**27**(26.64)	**27**
c-fat500-5	4	**64**	**64**(63.98)	**64**	frb100-40	5	**202(199.28)**	201(198.98)	200(198.59)
DSJC1000.5	4	**24(23.82)**	**24**(23.74)	**24**(23.8)	frb30-15-5	5	**63**	**63**(62.98)	**63**
frb100-40	4	**179(176.9)**	178(176.48)	177(175.82)	frb35-17-1	5	**73**	**73**(72.98)	**73**
frb30-15-2	4	**55(54.68)**	**55**(54.12)	**55**(54.58)	frb35-17-2	5	**72(71.82)**	**72**(71.14)	**72**(71.78)
frb30-15-4	4	**56(55.88)**	**56**(55.34)	**56**(55.78)	frb35-17-4	5	**74**	**74**(73.94)	**74**
frb30-15-5	4	**56**	**56**(55.94)	**56**	frb35-17-5	5	**74(73.7)**	**74**(73.04)	**74**(73.36)
frb35-17-3	4	**67**	**67**(66.22)	**67**	frb40-19-1	5	**88**	**88**(87.92)	**88**
frb35-17-4	4	**66(65.26)**	65	**66**(65.06)	frb40-19-2	5	**85(84.66)**	84	**85**(84.48)
frb40-19-1	4	**77**	**77**(76.96)	**77**	frb40-19-3	5	**83(82.66)**	82(81.98)	**83**(82.38)
frb40-19-2	4	**75(74.98)**	**75**(74.12)	**75**(74.94)	frb40-19-4	5	**81**	**81**(80.86)	**81**
frb40-19-4	4	**73(72.98)**	**73**(72.08)	**73**(72.94)	frb40-19-5	5	**83(82.7)**	**83**(82.02)	**83**(82.48)
frb40-19-5	4	**74**	**74**(73.62)	**74**(73.96)	frb45-21-1	5	**93(92.68)**	92(91.68)	**93**(92.58)
frb45-21-1	4	**82**	**82**(81.04)	**82**(81.94)	frb45-21-2	5	**92(91.88)**	**92**(91.04)	**92**(91.7)
frb45-21-2	4	**82(81.12)**	81(80.76)	**82**(81.06)	frb45-21-3	5	**94(93.28)**	**94**(92.82)	**94**(93.22)
frb45-21-3	4	**83(82.98)**	**83**(82.44)	**83**(82.80)	frb45-21-4	5	**94**	**94**(93.84)	**94**
frb45-21-4	4	**84(83.18)**	**84**(83.04)	**84**(83.08)	frb45-21-5	5	**92**	**92**(91.52)	**92**
frb45-21-5	4	**82(81.66)**	**82**(80.78)	**82**(81.52)	frb50-23-1	5	**104(103.56)**	103(102.48)	103
frb50-23-1	4	**92**	**92**(91.22)	**92**	frb50-23-2	5	**104(103.6)**	**104**(102.32)	103
frb50-23-2	4	**92(91.7)**	**92**(90.7)	**92**(91.68)	frb50-23-3	5	**99**	**99**(98.14)	**99**
frb50-23-3	4	**88**	**88**(87.4)	**88**	frb50-23-4	5	**104(103.28)**	**104**(102.42)	103
frb50-23-4	4	**92(91.2)**	91(90.78)	**92**(91.18)	frb50-23-5	5	**104**	**104**(102.98)	103
frb50-23-5	4	**92**	**92**(91.04)	**92**	frb53-24-1	5	**112**	**112**(110.98)	111
frb53-24-1	4	**99(98.98)**	**99**(97.96)	**99(98.98)**	frb53-24-2	5	**108(107.76)**	107(106.60)	107
frb53-24-2	4	**96(95.5)**	**96**(94.66)	**96**(95.48)	frb53-24-3	5	**110(109.1)**	109(108.14)	109
frb53-24-3	4	**97(96.84)**	**97**(96.02)	**97**(96.82)	frb53-24-4	5	**109**	**109**(107.94)	**109**
frb53-24-4	4	**97(96.32)**	96(95.54)	96	frb53-24-5	5	**107(106.28)**	106(105.12)	105
frb53-24-5	4	**94**	**94**(93.67)	**94**	frb56-25-1	5	**118(117.34)**	117(116.24)	117
frb56-25-1	4	**104(103.88)**	**104**(103.05)	**104**(103.86)	frb56-25-2	5	**117(116.32)**	116(115)	115
frb56-25-2	4	**104(103.04)**	103(102.84)	103(102.89)	frb56-25-3	5	**114**	**114**(112.82)	**114**(113.89)
frb56-25-3	4	**101(100.98)**	**101**(100.06)	**101**(100.97)	frb56-25-4	5	**114(113.2)**	113(112.14)	113
frb56-25-4	4	**101(100.52)**	**101**(99.73)	**101**(100.5)	frb56-25-5	5	**115(114.12)**	114(112.86)	114
frb56-25-5	4	**102(101.04)**	101(100.08)	101	frb59-26-1	5	**122(121.8)**	**122**(120.8)	121
frb59-26-1	4	**108(107.92)**	**108**(106.96)	**108**(107.69)	frb59-26-2	5	**122(121.78)**	**122**(120.3)	121
frb59-26-2	4	**108(107.96)**	**108**(106.8)	**108**(107.73)	frb59-26-3	5	**121(120.96)**	**121**(119.76)	120
frb59-26-3	4	**108(107.12)**	107(106.12)	107(106.98)	frb59-26-4	5	**122(120.86)**	121(119.18)	119
frb59-26-4	4	**107(106.96)**	**107**(105.84)	**107**(106.49)	frb59-26-5	5	**120(119.98)**	**120**(118.54)	119
frb59-26-5	4	**107(106.64)**	106(105.48)	**107**(106.2)	hamming10-2	5	**521(516.98)**	515(514.48)	515(512.64)
hamming10-4	4	69(68.08)	69(68.04)	**70(69.05)**	hamming10-4	5	**80**(79.02)	79(78.88)	**80**
hamming8-2	4	**130**	**130**(129.32)	**130**	keller6	5	125	125	**126(125.12)**
keller6	4	**117**(113.40)	**117(114.66)**	**117**(114.49)	p_hat1500-2	5	**117**	**117**(116.48)	**117**
p_hat1500-2	4	**107**	**107**(106.82)	**107**	p_hat1500-3	5	**165(164.9)**	164(163.98)	**165**(164.88)
san1000	4	**33**	**33**(32.94)	**33**	p_hat500-3	5	**90**	**90**(89.12)	**90**
san400_0.5_1	4	**29**	**29**(28.58)	**29**	san1000	5	**41**	**41**(40.92)	**41**
san400_0.7_1	4	**81(80.82)**	**81**(80.8)	**81**(80.8)	san400_0.5_1	5	**36**(35.28)	**36**(35.14)	**36**
san400_0.7_3	4	**50(49.82)**	**50**(49.78)	**50**(49.78)					

Table 2: Experimental results of Nukplex, DCCplex and KLS on classic instances II. All algorithms are executed for 100 independent runs, with a cutoff time of 1000 seconds for each run.

Instance	timelimit	k	Nukplex max(avg)	DCCplex max(avg)	KLS max(avg)	Instance	timelimit	k	Nukplex max(avg)	DCCplex max(avg)	KLS max(avg)
rt-retweet-crawl	100	2	**14**	**14**(13.3)	**14**	soc-orkut	100	3	**59**	58(53.1)	**59**
soc-digg	100	2	**57**	**57**(55.3)	**57**(56.8)	rt-retweet-crawl	100	4	**16**	**16**(15.5)	**16**
socfb-A-anon	100	2	**28**	**28**(27.3)	**28**	soc-digg	100	4	**69**	**69**(68.7)	**69**
socfb-B-anon	100	2	**27**	**27**(26.6)	**27**	socfb-A-anon	100	4	**35(34.88)**	34	34
soc-FourSquare	100	2	**35**	**35**(34.9)	**35**	socfb-B-anon	100	4	**33**	**33**(32.96)	**33**
soc-gowalla	100	2	**30**	**30**(29.3)	**30**	soc-pokec	100	4	**32**(31.6)	**32**(30.4)	**32**
soc-pokec	100	2	**31(30.8)**	26(25.7)	26	soc-orkut	100	4	**62**	60(48.7)	61
soc-orkut	100	2	**52**	**52**(49.3)	**52**	cage15	100	5	**11**	**11**	**11**(10.98)
audikw1	100	3	**39**	**39**	**39**(38.71)	soc-digg	100	5	**72**	**72**(71.4)	**72**(71.4)
rt-retweet-crawl	100	3	**15**	**15**(14.4)	**15**	socfb-B-anon	100	5	**35(34.88)**	**35**(34.5)	**35**(34.5)
soc-digg	100	3	**63**	**63**(61.8)	**63**	soc-orkut	100	5	**67(66.2)**	66(49.9)	63
socfb-A-anon	100	3	**32**	**32**(31.2)	**32**	soc-orkut	1000	2	**52**	**52**(51.7)	**52**
socfb-B-anon	100	3	**30**	**30**(29)	**30**	soc-orkut	1000	3	**59**	**59**(58.6)	**59**
soc-FourSquare	100	3	**39**	**39**(38.7)	**39**	soc-orkut	1000	4	**63(62.6)**	61	62(61.4)
soc-pokec	100	3	**32(31.12)**	29(28.8)	29	soc-orkut	1000	5	**68(66.8)**	66(64.5)	63

Table 3: Experimental results of Nukplex, DCCplex and KLS on large sparse instances.

Instance	k	Nukplex max(avg)	KpLeX-Gap max	DiseMKP max	Instance	k	Nukplex max(avg)	KpLeX-Gap max	DiseMKP max	Instance	k	Nukplex max(avg)	KpLeX-Gap max	DiseMKP max
frb100-40	2	**131(128.02)**	82	93	san1000	2	**18(17.06)**	10	16	johnson16-2-4	3	**16**	8	**16**
frb30-15-1	2	**40**	25	34	san200_0.7_1	2	**31**	30	30	johnson32-2-4	3	**32**	16	**32**
frb30-15-2	2	**39**	26	33	san200_0.7_2	2	**26(25.4)**	15	24	keller5	3	**45**	24	35
frb30-15-3	2	**40**	26	35	san200_0.9_2	2	**71**	51	70	keller6	3	**93**	50	64
frb30-15-4	2	**39**	26	34	san200_0.9_3	2	**54**	35	48	p_hat1000-1	3	**15**	9	**15**
frb30-15-5	2	**40**	26	34	san400_0.5_1	2	**15**	13	14	p_hat1000-2	3	**67**	44	64
frb35-17-1	2	**46**	29	38	san400_0.7_1	2	**42(41.14)**	40	40	p_hat1000-3	3	**98**	62	94
frb35-17-2	2	**46**	30	39	san400_0.7_2	2	**33(32.46)**	18	30	p_hat1500-1	3	**17**	11	16
frb35-17-3	2	**47**	31	40	san400_0.7_3	2	**28**	16	24	p_hat1500-2	3	**93**	60	90
frb35-17-4	2	**47**	31	40	san400_0.9_1	2	**103(102.98)**	99	100	p_hat1500-3	3	**133**	88	127
frb35-17-5	2	**46**	31	40	sanr200_0.9	2	**51**	38	49	p_hat300-3	3	**52**	33	51
frb40-19-1	2	**55**	35	43	sanr400_0.5	2	**15**	12	**15**	p_hat500-1	3	**14**	9	**14**
frb40-19-2	2	**54**	34	46	sanr400_0.7	2	**26**	19	24	p_hat500-2	3	**50**	34	49
frb40-19-3	2	**53**	34	42	frb100-40	3	**156(153.06)**	82	118	p_hat500-3	3	**72**	47	70
frb40-19-4	2	**52**	35	45	frb30-15-1	3	**48**	25	44	p_hat700-1	3	**15**	14	**15**
frb40-19-5	2	**53**	35	48	frb30-15-2	3	**48**	26	42	p_hat700-2	3	**62**	41	60
frb45-21-1	2	**59**	38	50	frb30-15-3	3	**48**	26	44	p_hat700-3	3	**89**	60	88
frb45-21-2	2	**59**	39	44	frb30-15-4	3	**47**	26	42	san1000	3	**25**	10	24
frb45-21-3	2	**60**	38	47	frb30-15-5	3	**48**	26	44	san200_0.7_1	3	**46**	30	45
frb45-21-4	2	**61(60.98)**	39	51	frb35-17-1	3	**55**	29	49	san200_0.7_2	3	**37**	15	36
frb45-21-5	2	**59**	39	48	frb35-17-2	3	**55(54.32)**	30	47	san200_0.9_3	3	**73**	35	72
frb50-23-1	2	**67**	44	55	frb35-17-3	3	**57**	31	50	san400_0.5_1	3	**22**	13	21
frb50-23-2	2	**67(66.38)**	44	55	frb35-17-4	3	**57**	31	51	san400_0.7_1	3	**61**	40	60
frb50-23-3	2	**65(64.82)**	44	51	frb35-17-5	3	**56**	31	49	san400_0.7_2	3	**47**(46.1)	18	45
frb50-23-4	2	**67(66.02)**	43	53	frb40-19-1	3	**66**	35	59	san400_0.7_3	3	**39(38.36)**	16	36
frb50-23-5	2	**67(66.98)**	42	50	frb40-19-2	3	**65**	34	57	san400_0.9_1	3	**150**	99	**150**
frb53-24-1	2	**71**	45	54	frb40-19-3	3	**63**	34	55	sanr200_0.7	3	**26**	16	**26**
frb53-24-2	2	**70**	45	53	frb40-19-4	3	**63**	35	54	sanr200_0.9	3	**61**	38	57
frb53-24-3	2	**70**	45	56	frb40-19-5	3	**63**	35	54	sanr400_0.5	3	**18**	12	**18**
frb53-24-4	2	**70(69.98)**	45	58	frb45-21-1	3	**71(70.9)**	38	60	sanr400_0.7	3	**30**	19	28
frb53-24-5	2	**69(68.44)**	45	53	frb45-21-2	3	**71**	39	59	frb100-40	4	**179(176.9)**	82	142
frb56-25-1	2	**75**	48	59	frb45-21-3	3	**72(71.74)**	38	61	frb30-15-1	4	**55**	25	51
frb56-25-2	2	**75**	47	58	frb45-21-4	3	**73(72.4)**	39	64	frb30-15-2	4	**55(54.68)**	26	49
frb56-25-3	2	**74**	48	57	frb45-21-5	3	**71(70.74)**	39	62	frb30-15-3	4	**56**	26	51
frb56-25-4	2	**74(73.98)**	48	58	frb50-23-1	3	**80(79.06)**	44	66	frb30-15-4	4	**56(55.88)**	26	49
frb56-25-5	2	**74(73.98)**	48	56	frb50-23-2	3	**79**	44	67	frb30-15-5	4	**56**	26	51
frb59-26-1	2	**79(78.98)**	51	62	frb50-23-3	3	**77(76.4)**	44	62	frb35-17-1	4	**64**	29	57
frb59-26-2	2	**79(78.96)**	49	59	frb50-23-4	3	**79**	43	65	frb35-17-2	4	**63**	30	56
frb59-26-3	2	**78(77.98)**	50	60	frb50-23-5	3	**80(79.4)**	42	66	frb35-17-3	4	**67**	31	61
frb59-26-4	2	**79(78.1)**	50	62	frb53-24-1	3	**85**	45	69	frb35-17-4	4	**66(65.26)**	31	60
frb59-26-5	2	**78**	50	57	frb53-24-2	3	**83(82.92)**	45	72	frb35-17-5	4	**65**	31	60
brock200_1	2	**26**	20	25	frb53-24-3	3	**84(83.18)**	45	68	frb40-19-1	4	**77**	35	71
brock400_1	2	**30**	23	28	frb53-24-4	3	**84(83.7)**	45	68	frb40-19-2	4	**75(74.98)**	34	67
brock400_2	2	**30**	23	29	frb53-24-5	3	**82**	45	66	frb40-19-3	4	**74**	34	64
brock400_3	2	**31(30.64)**	22	28	frb56-25-1	3	**90(89.46)**	48	76	frb40-19-4	4	**73(72.98)**	35	65
brock400_4	2	**33**	23	28	frb56-25-2	3	**89**	47	76	frb40-19-5	4	**74**	35	65
brock800_1	2	**25**	19	23	frb56-25-3	3	**88(87.92)**	48	73	frb45-21-1	4	**82**	38	73
brock800_2	2	**25**	19	23	frb56-25-4	3	**88(87.66)**	48	73	frb45-21-2	4	**82(81.12)**	39	71
brock800_3	2	**25**	19	23	frb56-25-5	3	**88(87.48)**	48	72	frb45-21-3	4	**83(82.98)**	38	72
brock800_4	2	**26(25.96)**	18	23	frb59-26-1	3	**94(93.44)**	51	80	frb45-21-4	4	**84(83.18)**	39	75
C1000.9	2	**82(81.98)**	60	66	frb59-26-2	3	**94(93.66)**	49	77	frb45-21-5	4	**82(81.66)**	39	74
C125.9	2	**43**	33	42	frb59-26-3	3	**94(92.98)**	50	74	frb50-23-1	4	**92**	44	79
C2000.5	2	**20(19.78)**	15	17	frb59-26-4	3	**93(92.9)**	50	75	frb50-23-2	4	**92(91.7)**	44	82
C2000.9	2	**94(93.42)**	68	74	frb59-26-5	3	**93(92.88)**	50	78	frb50-23-3	4	**88**	44	74
C250.9	2	**55**	41	50	brock200_1	3	**30**	20	29	frb50-23-4	4	**92(91.2)**	43	77
C4000.5	2	**21(20.58)**	15	18	brock200_3	3	**20**	13	**20**	frb50-23-5	4	**92**	42	77
C500.9	2	**69**	50	61	brock200_4	3	**23**	15	**23**	frb53-24-1	4	**99(98.98)**	45	86
DSJC1000.5	2	**18**	14	16	brock400_1	3	**36**	23	32	frb53-24-2	4	**96(95.5)**	45	82
DSJC500.5	2	**16**	12	**16**	brock400_2	3	**36**	23	34	frb53-24-3	4	**97(96.84)**	45	80
gen200_p0.9_44	2	**53**	38	50	brock400_3	3	**36**	22	33	frb53-24-4	4	**97(96.32)**	45	84
gen200_p0.9_55	2	**57**	40	52	brock400_4	3	**36**	23	33	frb53-24-5	4	**94**	45	79
gen400_p0.9_55	2	**68(67.8)**	47	56	brock800_1	3	**30(29.9)**	19	26	frb56-25-1	4	**104(103.88)**	48	91
gen400_p0.9_65	2	**74**	48	64	brock800_2	3	**30**	19	28	frb56-25-2	4	**104(103.04)**	47	90
gen400_p0.9_75	2	**80**	47	74	brock800_3	3	**30**	19	26	frb56-25-3	4	**101(100.98)**	48	87
hamming10-4	2	**48**	36	41	brock800_4	3	**29**	18	25	frb56-25-4	4	**101(100.52)**	48	85
johnson16-2-4	2	**10**	8	**10**	C1000.9	3	**96(95.96)**	60	83	frb56-25-5	4	**102(101.04)**	48	85
johnson32-2-4	2	**21**	16	**21**	C125.9	3	**51**	33	50	frb59-26-1	4	**108(107.92)**	51	92
keller5	2	**31**	24	30	C2000.5	3	**23(22.5)**	15	20	frb59-26-2	4	**108(107.96)**	49	93
keller6	2	**63**	50	62	C2000.9	3	**109(108.64)**	68	88	frb59-26-3	4	**108(107.12)**	50	90
MANN_a27	2	**236(235.96)**	**236**	234	C250.9	3	**65**	41	59	frb59-26-4	4	**107(106.96)**	50	90
MANN_a45	2	**662**	342	660	C4000.5	3	**25(24)**	15	20	frb59-26-5	4	**107(106.64)**	50	91
MANN_a81	2	**2162**	1096	2160	C500.9	3	**81**	50	73	brock200_1	4	**35**	20	33
p_hat1000-2	2	**56**	44	55	c-fat500-10	3	**126**	**126**	0	brock200_2	4	**18**	10	**18**
p_hat1000-3	2	**82**	62	78	DSJC1000.5	3	**21**	14	20	brock200_3	4	**23**	13	**23**
p_hat1500-1	2	**14**	11	**14**	DSJC500.5	3	**19**	12	18	brock200_4	4	**26**	15	**26**
p_hat1500-2	2	**80**	60	74	gen200_p0.9_44	3	**66**	38	64	brock400_1	4	**41(40.98)**	23	36
p_hat1500-3	2	**114**	88	109	gen200_p0.9_55	3	**64**	40	62	brock400_2	4	**41(40.98)**	23	39
p_hat300-3	2	**44**	33	43	gen400_p0.9_55	3	**87**	47	82	brock400_3	4	**41**	22	38
p_hat500-2	2	**42**	34	**42**	gen400_p0.9_65	3	**101**	48	96	brock400_4	4	**41**	23	37
p_hat500-3	2	**62**	47	60	gen400_p0.9_75	3	**114**	47	111	brock800_1	4	**34**	19	31
p_hat700-2	2	**52**	49	50	hamming10-4	3	**64**	36	51	brock800_2	4	**34**	19	30
p_hat700-3	2	**76**	60	73	hamming8-4	3	**20**	16	**20**	brock800_3	4	**34**	19	30

Table 4: Experimental results of Nukplex, KpLeX-Gap and DiseMKP on classic instances I. Nukplex is executed for 100 independent runs, with a cutoff time of 1000 seconds for each run, whereas the two exact algorithms are executed with a cutoff time of 1800 seconds.

Instance	k	Nukplex max(avg)	KpLeX-Gap max	DiseMKP max	Instance	k	Nukplex max(avg)	KpLeX-Gap max	DiseMKP max	Instance	k	Nukplex max(avg)	KpLeX-Gap max	DiseMKP max
brock800_4	4	**34(33.08)**	18	29	frb30-15-1	5	**63**	25	59	C1000.9	5	**122(121.26)**	60	106
C1000.9	4	**110(109.28)**	60	96	frb30-15-2	5	**62**	26	57	C125.9	5	**65**	33	64
C125.9	4	**58**	33	**58**	frb30-15-3	5	**63**	26	58	C2000.5	5	**28**	15	24
C2000.5	4	**26(25.08)**	15	22	frb30-15-4	5	**62**	26	57	C2000.9	5	**137(136.34)**	68	116
C2000.9	4	**123(122.62)**	68	102	frb30-15-5	5	**63**	26	57	C250.9	5	**84**	41	80
C250.9	4	**75**	41	69	frb35-17-1	5	**73**	29	65	C4000.5	5	**30(29.94)**	15	25
C4000.5	4	**28(26.7)**	15	22	frb35-17-2	5	**72(71.82)**	30	64	C500.9	5	**104(103.62)**	50	94
C500.9	4	**93(92.9)**	50	84	frb35-17-3	5	**75**	31	69	DSJC1000.5	5	**27**	14	23
DSJC1000.5	4	**24(23.82)**	14	21	frb35-17-4	5	**74**	31	68	DSJC500.5	5	**24**	12	22
DSJC500.5	4	**21**	12	20	frb35-17-5	5	**74(73.7)**	31	68	gen200_p0.9_44	5	**84**	38	79
gen200_p0.9_44	4	**76**	38	74	frb40-19-1	5	**88**	35	81	gen200_p0.9_55	5	**80**	40	79
gen200_p0.9_55	4	**73**	40	72	frb40-19-2	5	**85(84.66)**	34	77	gen400_p0.9_55	5	**124**	47	119
gen400_p0.9_55	4	**112**	47	106	frb40-19-3	5	**83(82.66)**	34	74	gen400_p0.9_65	5	**138**	48	131
gen400_p0.9_65	4	**132**	48	123	frb40-19-4	5	**81**	35	73	gen400_p0.9_75	5	**136**	47	134
gen400_p0.9_75	4	**136**	47	134	frb40-19-5	5	**83(82.7)**	35	73	hamming10-2	5	**521(516.98)**	512	512
hamming10-4	4	**69(68.08)**	36	63	frb45-21-1	5	**93(92.68)**	38	83	hamming10-4	5	**80(79.02)**	36	73
hamming8-2	4	**130**	128	128	frb45-21-2	5	**92(91.88)**	39	81	hamming8-2	5	**152**	128	134
hamming8-4	4	**25**	16	**25**	frb45-21-3	5	**94(93.28)**	38	84	hamming8-4	5	**32**	16	**32**
johnson16-2-4	4	**19**	8	**19**	frb45-21-4	5	**94**	39	85	johnson16-2-4	5	**24**	8	**24**
johnson32-2-4	4	**38**	16	**38**	frb45-21-5	5	**92**	39	82	johnson32-2-4	5	**48**	16	**48**
keller4	4	**23**	11	22	frb50-23-1	5	**104(103.56)**	44	93	keller4	5	**28**	11	27
keller5	4	**53**	24	46	frb50-23-2	5	**104(103.6)**	44	93	keller5	5	**61**	24	54
keller6	4	**117(113.4)**	50	93	frb50-23-3	5	**99**	44	87	keller6	5	**125**	50	119
p_hat1000-1	4	**18**	9	17	frb50-23-4	5	**104(103.28)**	43	89	p_hat1000-1	5	**20**	9	**20**
p_hat1000-2	4	**76**	44	73	frb50-23-5	5	**104**	42	92	p_hat1000-2	5	**84**	44	**84**
p_hat1000-3	4	**111**	62	106	frb53-24-1	5	**112**	45	98	p_hat1000-3	5	**122**	62	116
p_hat1500-1	4	**19**	11	18	frb53-24-2	5	**108(107.76)**	45	94	p_hat1500-1	5	**21**	11	20
p_hat1500-2	4	**107**	60	103	frb53-24-3	5	**110(109.1)**	45	94	p_hat1500-2	5	**117**	112	114
p_hat1500-3	4	**150**	88	143	frb53-24-4	5	**109**	45	96	p_hat1500-3	5	**165(164.9)**	88	158
p_hat300-2	4	**41**	25	**41**	frb53-24-5	5	**107(106.28)**	45	94	p_hat300-3	5	**65**	33	64
p_hat300-3	4	**59**	33	58	frb56-25-1	5	**118(117.34)**	48	106	p_hat500-1	5	**18**	9	**18**
p_hat500-1	4	**16**	14	**16**	frb56-25-2	5	**117(116.32)**	47	99	p_hat500-2	5	**62**	60	61
p_hat500-2	4	**57**	56	56	frb56-25-3	5	**114**	48	99	p_hat500-3	5	**90**	47	87
p_hat500-3	4	**81**	47	79	frb56-25-4	5	**114(113.2)**	48	97	p_hat700-1	5	**19**	17	18
p_hat700-1	4	**17**	16	**17**	frb56-25-5	5	**115(114.12)**	48	100	p_hat700-2	5	**79**	73	76
p_hat700-2	4	**70**	67	69	frb59-26-1	5	**122(121.8)**	51	110	p_hat700-3	5	**109**	60	107
p_hat700-3	4	**100**	60	98	frb59-26-2	5	**122(121.78)**	49	106	san1000	5	**41**	10	40
san1000	4	**33**	10	32	frb59-26-3	5	**121(120.96)**	50	105	san200_0.7_1	5	**75**	30	**75**
san200_0.7_1	4	**60**	30	**60**	frb59-26-4	5	**122(120.86)**	50	103	san200_0.7_2	5	**60**	15	**60**
san200_0.7_2	4	**49**	15	48	frb59-26-5	5	**120(119.98)**	50	104	san200_0.9_2	5	**105**	51	103
san200_0.9_2	4	**105**	**105**	103	brock200_1	5	**39**	20	37	san200_0.9_3	5	**100**	35	95
san200_0.9_3	4	**96**	35	95	brock200_2	5	**20**	10	**20**	san400_0.5_1	5	**36(35.28)**	13	35
san400_0.5_1	4	**29**	13	28	brock200_3	5	**26**	13	25	san400_0.7_1	5	**100**	40	**100**
san400_0.7_1	4	**81(80.82)**	40	80	brock200_4	5	**30**	15	29	san400_0.7_2	5	**76**	18	75
san400_0.7_2	4	**61**	18	60	brock400_1	5	**46(45.68)**	23	42	san400_0.7_3	5	**61**	16	60
san400_0.7_3	4	**50(49.82)**	16	48	brock400_2	5	**45**	23	43	san400_0.9_1	5	**200**	99	193
san400_0.9_1	4	**200**	99	193	brock400_3	5	**46(45.98)**	22	43	sanr200_0.7	5	**33**	16	31
sanr200_0.7	4	**30**	16	29	brock400_4	5	**46**	23	42	sanr200_0.9	5	**77**	38	74
sanr200_0.9	4	**69**	38	65	brock800_1	5	**37**	19	34	sanr400_0.5	5	**24**	12	22
sanr400_0.5	4	**21**	12	**21**	brock800_2	5	**38**	19	33	sanr400_0.7	5	**39**	19	36
sanr400_0.7	4	**35**	19	32	brock800_3	5	**38**	19	33					
frb100-40	5	**202(199.28)**	82	170	brock800_4	5	**37**	18	33					

Table 5: Experimental results of Nukplex, KpLeX-Gap and DiseMKP on classic instances II. Nukplex is executed for 100 independent runs, with a cutoff time of 1000 seconds for each run, whereas the two exact algorithms are executed with a cutoff time of 1800 seconds.

Instance	k	Nukplex max(avg)	KpLeX-Gap max	DiseMKP max	Instance	k	Nukplex max(avg)	KpLeX-Gap max	DiseMKP max	Instance	k	Nukplex max(avg)	KpLeX-Gap max	DiseMKP max
333SP	2	**5**	**5**	4	soc-orkut	3	**59**	**59**	31	as-22july06	5	**24**	**24**	23
kron_*-logn16	2	**140**	136	138	soc-buzznet	3	**41**	27	**41**	cit-Patents	5	**31**	8	**31**
rgg_n_2_17_s0	2	**16**	**16**	15	soc-flickr	3	**77**	76	**77**	audikw1	5	**45**	**45**	33
soc-flickr	2	**68**	64	66	audikw1	4	**45**	**45**	33	kron_*-logn16	5	**152**	136	23
soc-digg	2	**57**	**57**	25	cit-Patents	4	**26**	6	**26**	WikiTalk	5	**44**	**44**	42
soc-orkut	2	**52**	**52**	27	kron_*-logn16	4	**148**	146	147	soc-buzznet	5	**50**	48	49
audikw1	3	**39**	**39**	36	WikiTalk	4	**41**	40	39	soc-flickr	5	**90**	89	89
eu-2005	3	**390**	**390**	389	soc-buzznet	4	**46**	27	45	tech-as-skitter	5	**75**	**75**	72
kron_*-logn16	3	**144**	136	143	soc-orkut	4	**63**(62.6)	**63**	34	soc-digg	5	**72**	71	36
WikiTalk	3	**36**	35	35	soc-flickr	4	**85**	56	84	soc-orkut	5	**68**(66.8)	**68**	37
tech-as-skitter	3	**71**	**71**	67	tech-as-skitter	4	**74**	**74**	69					
soc-digg	3	**63**	59	29	soc-digg	4	**69**	66	33					

Table 6: Experimental results of Nukplex, KpLeX-Gap and DiseMKP on large sparse instances. Nukplex is executed for 100 independent runs, with a cutoff time of 1000 seconds for each run, whereas the two exact algorithms are executed with a cutoff time of 1800 seconds.

Instance	k	Nukplex max(avg)	DiseMKP max	KpLeX-Gap max	Instance	k	Nukplex max(avg)	DiseMKP max	KpLeX-Gap max	Instance	k	Nukplex max(avg)	DiseMKP max	KpLeX-Gap max
scc_retweet	2	**166**	165	**166**	soc-digg	10	**87**	53	**87**	soc-twitter-follows	15	**30**	26	**30**
soc-BlogCatalog	2	**54**	**54**	52	socfb-A-anon	10	**47**	43	**47**	soc-youtube	15	**43**	41	**43**
soc-digg	2	**57**	25	**57**	socfb-Duke14	10	**60**	59	**60**	soc-youtube-snap	15	**43**	42	**43**
soc-flickr	2	**68**	66	64	socfb-MIT	10	**57**	56	**57**	tech-as-skitter	15	**95**	89	**95**
soc-FourSquare	2	**35**	33	**35**	socfb-Stanford3	10	**75**	57	**75**	tech-internet-as	15	**37**	36	**37**
soc-orkut	2	**52**	27	**52**	socfb-UCLA	10	**67**	66	**67**	web-spam	15	**47**	45	**47**
soc-BlogCatalog	3	**60**	58	58	socfb-Ulllinois	10	**82**	47	**82**	web-wikipedia2009	15	**37**	35	35
soc-buzznet	3	**41**	**41**	27	soc-flickr	10	**114**	113	56	ia-enron-large	15	**45**	42	**45**
soc-digg	3	**63**	29	59	soc-FourSquare	10	**53**	49	**53**	ia-wiki-Talk	20	**51**	22	50
soc-flickr	3	**77**	**77**	76	soc-gowalla	10	**42**	39	**42**	scc_reality	20	**1251**(1248.9)	1248	**1251**
soc-FourSquare	3	**39**	36	**39**	soc-LiveMocha	10	**41**	25	**41**	sc-msdoor	20	**45**	40	**45**
soc-orkut	3	**59**	31	**59**	soc-orkut	10	**89**(88.2)	51	**89**	sc-pkustk11	20	**56**(55.3)	**56**	**56**
tech-as-skitter	3	**71**	67	**71**	soc-youtube-snap	10	**35**	34	**35**	sc-pkustk13	20	**55**	54	**55**
soc-orkut	4	**63**(62.6)	**63**	34	tech-as-skitter	10	**84**	80	**84**	sc-pwtk	20	**46**	38	**46**
soc-buzznet	4	**46**	45	27	web-spam	10	**40**	39	**40**	sc-shipsec5	20	**44**	42	**44**
soc-digg	4	**69**	33	66	web-wikipedia2009	10	**33**	26	**33**	soc-BlogCatalog	20	**123**	**123**	41
socfb-Duke14	4	**45**	43	**45**	ia-enron-large	10	**38**	36	**38**	soc-buzznet	20	**89**	88	88
socfb-Indiana	4	**57**	56	**57**	ia-wiki-Talk	15	**44**	42	**44**	soc-delicious	20	**49**	48	**49**
soc-flickr	4	**85**	84	56	sc-pkustk13	15	**50**	45	**50**	soc-digg	20	**109**	81	**109**
soc-karate	4	**8**	7	**8**	sc-pwtk	15	**38**	36	**38**	socfb-A-anon	20	**61**	58	**61**
tech-as-skitter	4	**74**	69	**74**	soc-BlogCatalog	15	**109**	**109**	41	socfb-B-anon	20	**64**	52	**64**
soc-BlogCatalog	4	**66**	64	61	soc-buzznet	15	**78**	77	76	socfb-CMU	20	**67**	66	**67**
soc-buzznet	5	**50**	49	48	soc-delicious	15	**43**	42	**43**	socfb-Stanford3	20	**77**	75	**77**
soc-digg	5	**72**	36	71	soc-digg	15	**100**	68	**100**	socfb-Texas84	20	**94**	93	**94**
socfb-Duke14	5	**48**	46	**48**	socfb-A-anon	15	**54**	52	**54**	socfb-Ulllinois	20	**96**	65	**96**
socfb-Stanford3	5	**67**	65	**67**	socfb-B-anon	15	**57**	45	**57**	soc-flickr	20	**153**	152	150
soc-flickr	5	**90**	89	89	socfb-CMU	15	**62**	60	**62**	soc-FourSquare	20	**65**	54	**65**
soc-FourSquare	5	**44**	38	**44**	socfb-Stanford3	15	**77**	67	**77**	soc-LiveMocha	20	**60**	41	**60**
soc-orkut	5	**68**(66.2)	37	**68**	socfb-Ulllinois	15	**89**	57	**89**	soc-orkut	20	108(100.5)	73	**111**
tech-as-skitter	5	**75**	72	**75**	socfb-Wisconsin87	15	**67**	65	**67**	soc-pokec	20	**55**	49	**55**
soc-BlogCatalog	5	**72**	69	70	soc-flickr	15	**135**	133	56	soc-slashdot	20	**68**	67	**68**
ia-wiki-Talk	10	**35**	34	**35**	soc-FourSquare	15	**59**	49	**59**	soc-youtube	20	**50**	48	**50**
sc-pkustk11	10	**48**(43.8)	**48**	**48**	soc-gowalla	15	**49**	47	**49**	soc-youtube-snap	20	**51**	48	**51**
sc-pwtk	10	**33**(31.8)	30	**33**	soc-LiveMocha	15	**52**	34	**52**	tech-as-skitter	20	**104**	102	**104**
soc-BlogCatalog	10	**93**	90	90	soc-orkut	15	99(96.4)	63	**101**	ia-enron-large	20	**51**	49	**51**
soc-buzznet	10	**65**	64	64	soc-pokec	15	**49**	42	**49**	web-wikipedia2009	20	**46**	44	45

Table 7: Experimental results of Nukplex, KpLeX-Gap and DiseMKP on the Network-Repo instances. Nukplex is executed for 10 independent runs, with a cutoff time of 1000 seconds for each run, whereas the two exact algorithms are executed with a cutoff time of 1800 seconds.

Instance	k	Nukplex max(avg)	KpLeX-Gap max	DiseMKP max	Instance	k	Nukplex max(avg)	KpLeX-Gap max	DiseMKP max	Instance	k	Nukplex max(avg)	KpLeX-Gap max	DiseMKP max
333SP	2	**5**	**5**	4	audikw1	5	**45**	**45**	33	kron *-logn16	15	**182**	180	178
kron *-logn16	2	**140**	136	138	cit-Patents	5	**31**	8	**31**	Slashdot0902	15	**61**	**61**	60
rgg n 2 17 s0	2	**16**	**16**	15	kron *-logn16	5	**152**	136	23	web-Stanford	15	**74**	72	**74**
audikw1	3	**39**	**39**	36	WikiTalk	5	**44**	**44**	42	WikiTalk	15	**70**	69	**70**
eu-2005	3	**390**	**390**	389	audikw1	10	**48**	**48**	45	Wiki-Vote	15	**47**	**47**	46
kron *-logn16	3	**144**	136	143	Email-EuAll	10	**36**	**36**	35	audikw1	20	**60**(58)	**60**	54
WikiTalk	3	**36**	35	35	kron *-logn16	10	**168**	165	164	Slashdot0811	20	**68**	**68**	67
audikw1	4	**45**	**45**	33	WikiTalk	10	**58**	56	57	lashdot0902	20	**69**	**69**	68
cit-Patents	4	**26**	6	**26**	audikw1	15	**52**	**52**	45	web-Stanford	20	**82**	**82**	48
kron *-logn16	4	**148**	146	147	cit-Patents	15	**63**	**63**	62	WikiTalk	20	**81**	79	79
WikiTalk	4	**41**	40	39	cond-mat-2005	15	**38**	**38**	31					

Table 8: Experimental results of Nukplex, KpLeX-Gap and DiseMKP on the 10th-DIMACS instances. Nukplex is executed for 10 independent runs, with a cutoff time of 1000 seconds for each run, whereas the two exact algorithms are executed with a cutoff time of 1800 seconds.