

Max-SAT Evaluation 2009

Josep Argelich (INESC, Lisboa)

Chu Min Li (Université de Picardie)

Felip Manyà (IIIA-CSIC)

Jordi Planes (Universitat de Lleida)



Objectives

- Evaluate the performance of existing solvers
- Identify challenging benchmarks
- Identify successful solving techniques
- Stimulate researchers to improve their solvers and to submit new challenging benchmarks
- Gain new insights for future evaluations

Categories

- Max-SAT (Random / Crafted / Industrial)
- Partial Max-SAT (Random / Crafted / Industrial)
- Weighted Max-SAT (Random / Crafted)
- Weighted Partial Max-SAT (Random / Crafted / Industrial)

Computational resources

Experiments performed on a Linux cluster with 2Ghz AMD Opteron processors with 512Mb of RAM provided by the Universitat de Lleida

Solvers

- **Clone**: Knot Pipatsrisawat, Akop Palyan, Mark Chavira, Arthur Choi, Adnan Darwiche
- **IncMaxSatz, IncWMaxSatz**: Han Lin, Kaile Su, Chu Min Li, Josep Argelich
- **IUT_BCMB_Maxsatz, IUT_BCMB_LSMaksatz**: Abdorrahim Bahrami, Seyed Rasoul Mousavi, Kiarash Bazargan
- **IUT_BCMB_WMaxsatz, IUT_BCMB_LSWMaxsatz**: Seyed Rasoul Mousavi, Kiarash Bazargan, Abdorrahim Bahrami
- **MsUncore**: Joao Marques-Silva, Vasco Manquinho, Jordi Planes
- **PM2, WPM1**: Carlos Ansótegui, Maria Luisa Bonet, Jordi Levy
- **SAT4J MAXSAT**: Daniel Le Berre
- **WBO**: Vasco Manquinho, Joao Marques-Silva, Jordi Planes
- **W-MaxSatz**: Chu Min Li, Felip Manyà, Josep Argelich

Benchmarks

- Max-SAT (738 instances) Timeout of 1800 sec.
 - Random (450 instances)
 - Crafted (167 instances)
 - Industrial (121 instances)
- Partial Max-SAT (1500 instances) Timeout of 1800 sec.
 - Random (150 instances)
 - Crafted (385 instances)
 - Industrial (965 instances)

Benchmarks

- Weighted Max-SAT (309 instances) Timeout of 1800 sec.
 - Random (160 instances)
 - Crafted (149 instances)
- Weighted Partial Max-SAT (932 instances) Timeout of 1800 sec.
 - Random (150 instances)
 - Crafted (702 instances)
 - Industrial (80 instances)

Max-SAT Category Solvers

- IUT_BMB_Maxsatz
- IncMaxSatz
- WMaxSatz
- MSUnCore
- PM2
- SAT4J-MAXSAT
- W-MaxSatz
- WBO
- WPM1

Max-SAT Category Benchmarks

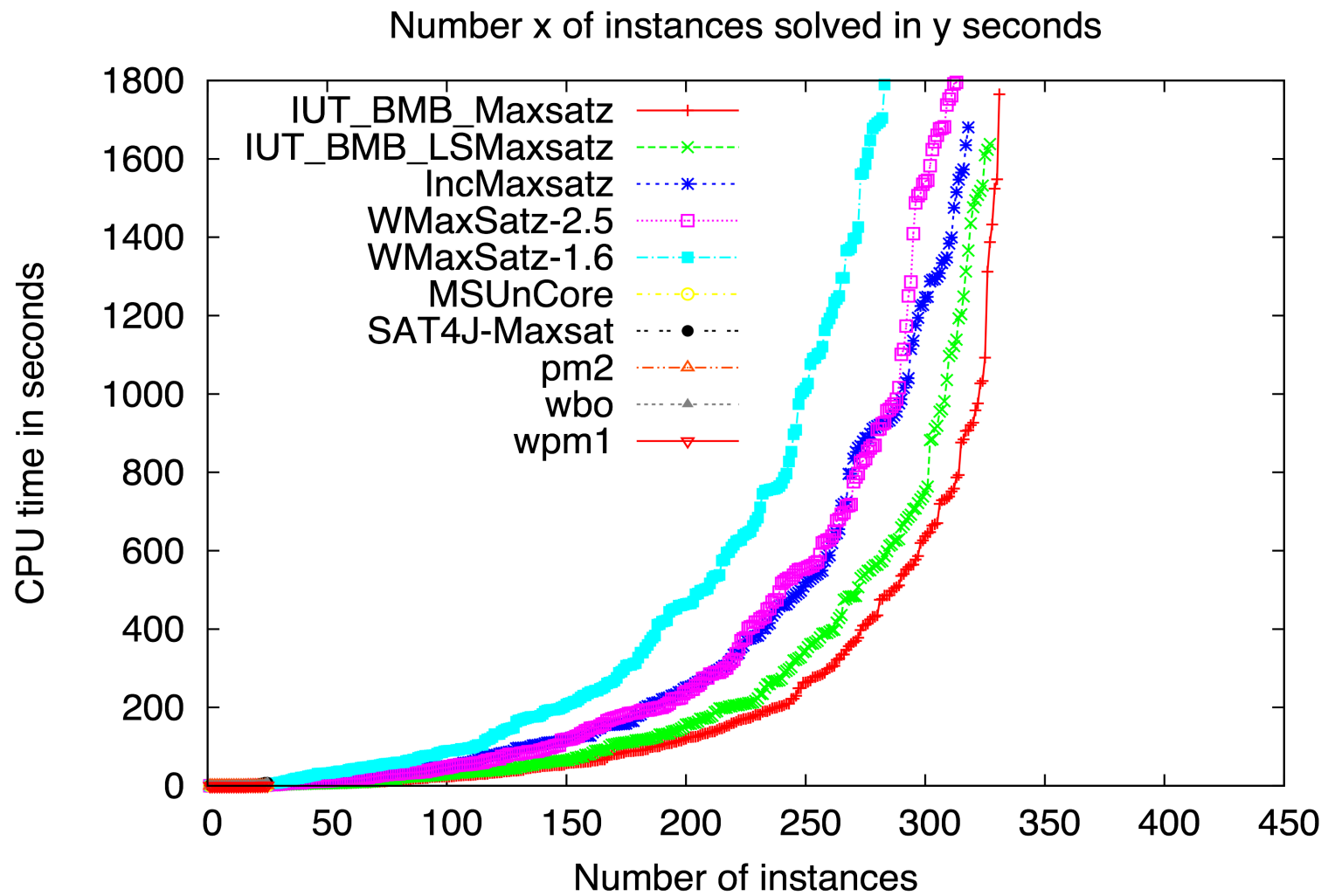
- Random
 - Highgirth instances submitted by Ramón Béjar
 - Max-2-SAT & Max-3-SAT instances (restructured)
- Crafted
 - Bipartite instances submitted by Ramón Béjar
 - Max-Cut instances (from previous evaluations)
- Industrial
 - Circuit debugging instances submitted by Yibin Chen and Sean Safarpour
 - Instances submitted by Sean Safarpour

Random Max-SAT

Instance_set	#I	IUT_BMB_Maxsatz	IUT_BMB_LSMaxsatz	IncMaxsatz	WMaxSatz-2.5	WMaxSatz-1.6
highgirth/4SAT/	50	414.02(11)	1231.13(8)	841.01(23)	1186.80(4)	1262.62(6)
highgirth/5SAT/	50	0.01(25)	0.41(25)	0.25(25)	0.61(25)	0.53(25)
max2sat/100v/	50	14.10(50)	16.21(50)	90.93(50)	44.38(50)	126.52(50)
max2sat/120v/	50	120.25(50)	120.94(50)	427.78(45)	289.46(49)	485.06(42)
max2sat/140v/	50	371.76(48)	377.75(48)	709.27(27)	542.69(43)	772.33(23)
max3sat/60v/	50	112.43(50)	145.66(50)	115.49(50)	221.91(50)	266.29(50)
max3sat/70v/	50	380.33(48)	459.96(48)	397.27(49)	528.96(44)	508.06(41)
max3sat/80v/	50	271.25(49)	325.91(48)	283.95(49)	452.78(48)	420.57(46)
Solved instances		331	327	318	313	283

Instance_set	MSUnCore	SAT4J-Maxsat	pm2	wbo	wpm1
highgirth/4SAT/	0.00(0)	0.00(0)	0.00(0)	0.00(0)	0.00(0)
highgirth/5SAT/	0.14(25)	2.31(25)	0.25(25)	1.03(25)	0.26(25)
max2sat/100v/	0.00(0)	0.00(0)	0.00(0)	0.00(0)	0.00(0)
max2sat/120v/	0.00(0)	0.00(0)	0.00(0)	0.00(0)	0.00(0)
max2sat/140v/	0.00(0)	0.00(0)	0.00(0)	0.00(0)	0.00(0)
max3sat/60v/	0.00(0)	0.00(0)	0.00(0)	0.00(0)	0.00(0)
max3sat/70v/	0.00(0)	0.00(0)	0.00(0)	0.00(0)	0.00(0)
max3sat/80v/	0.00(0)	0.00(0)	0.00(0)	0.00(0)	0.00(0)
Solved instances	450	25	25	25	25

Random Max-SAT

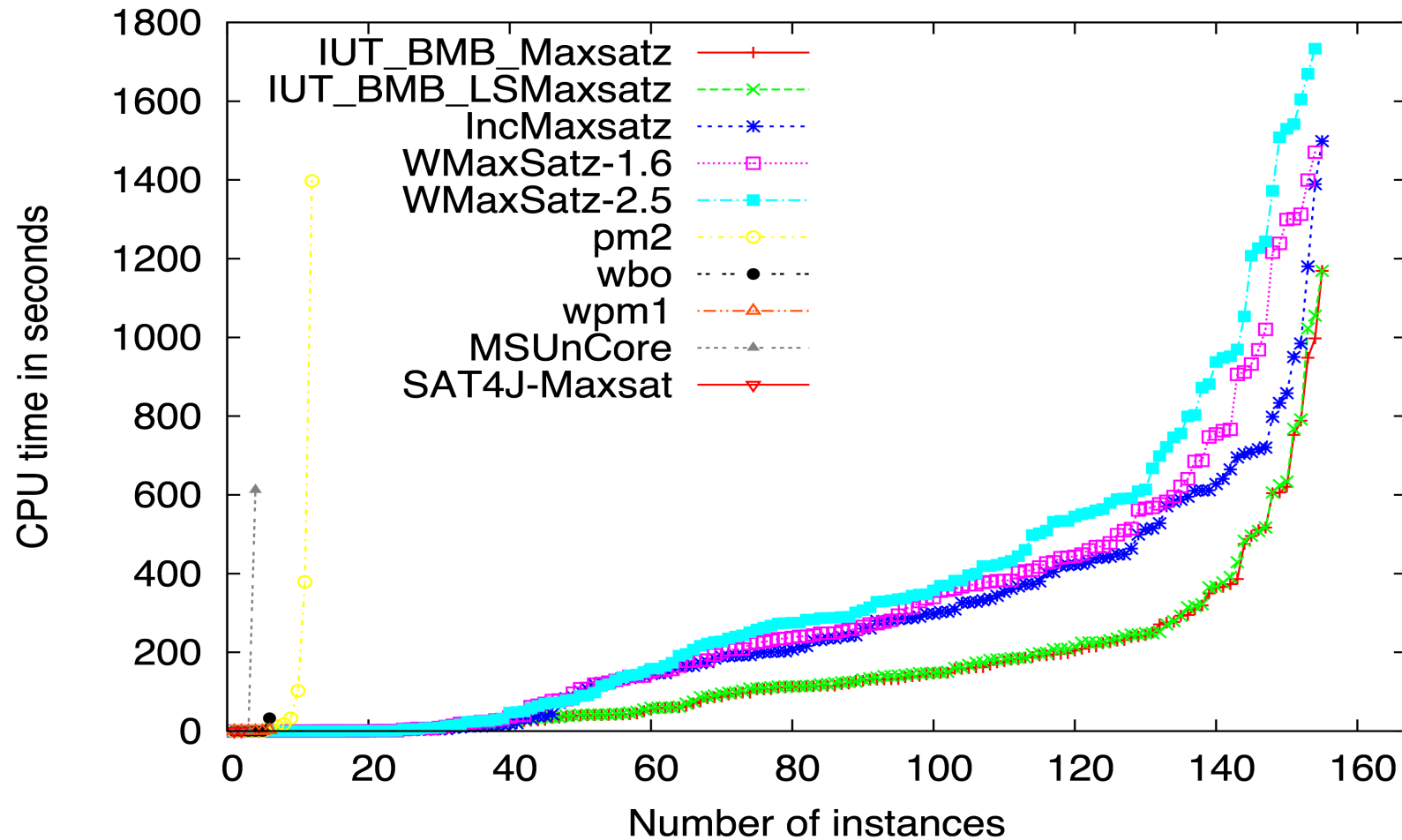


Crafted Max-SAT

Instance_set	#I	IUT_BMB_Maxsatz	IUT_BMB_LSMaksa	IncMaxsatz	WMaxSatz-1.6	WMaxSatz-2.5
MAXCUT/DIMACS_MOD/	62	98.70(52)	103.86(52)	81.53(52)	151.55(52)	183.39(52)
MAXCUT/SPINGLASS/	5	12.85(3)	12.97(3)	29.02(3)	4.88(3)	5.57(3)
bipartite/maxcut-140-630-0.7/	50	213.06(50)	219.08(50)	434.82(50)	447.06(49)	481.87(49)
bipartite/maxcut-140-630-0.8/	50	156.19(50)	159.74(50)	313.49(50)	336.97(50)	422.94(50)
Solved instances		155	155	155	154	154
Instance_set		pm2	wbo	wpm1	MSUnCore	SAT4J-Maxsat
MAXCUT/DIMACS_MOD/		194.40(10)	0.01(4)	0.03(4)	0.01(3)	0.57(2)
MAXCUT/SPINGLASS/		3.92(2)	16.32(2)	0.84(2)	612.12(1)	0.00(0)
bipartite/maxcut-140-630-0.7/		0.00(0)	0.00(0)	0.00(0)	0.00(0)	0.00(0)
bipartite/maxcut-140-630-0.8/		0.00(0)	0.00(0)	0.00(0)	0.00(0)	0.00(0)
Solved instances	167	12	6	6	4	2

Crafted Max-SAT

Number x of instances solved in y seconds



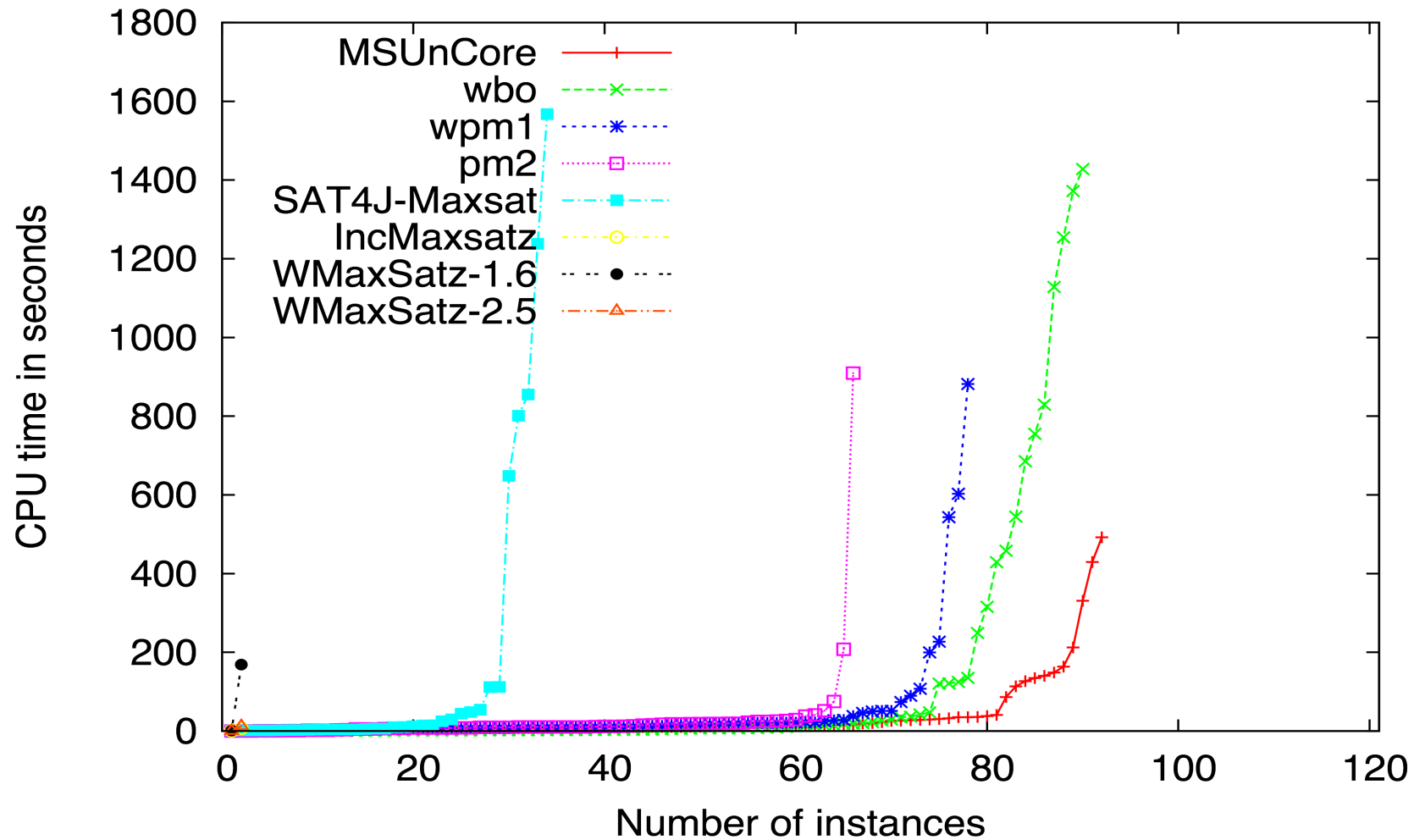
Industrial Max-SAT

Instance_set	#I	MSUnCore	wbo	wpm1	pm2
CircuitDebuggingProblems/	9	17.50(8)	178.88(8)	19.52(5)	20.32(5)
SeanSafarpour/	112	37.97(84)	110.29(82)	48.72(73)	30.41(61)
Solved instances		92	90	78	66

Instance_set	SAT4J-Maxsat	IncMaxsatz	WMaxSatz-1.6	WMaxSatz-2.5
CircuitDebuggingProblems/	33.37(2)	0.00(0)	0.00(0)	0.00(0)
SeanSafarpour/	174.42(32)	3.59(2)	84.69(2)	6.06(2)
Solved instances	121	34	2	2

Industrial Max-SAT

Number x of instances solved in y seconds



Partial Max-SAT Category Solvers

- Clone
- IUT_BCMB_WMaxsatz
- IncWMaxSatz
- MSUnCore
- PM2
- SAT4J-MAXSAT
- W-MaxSatz
- WBO
- WPM1

Partial Max-SAT Category Benchmarks

- Random
 - Partial Max-2-SAT and Max-3-SAT (restructured from previous evaluations)
- Crafted
 - JobShop submitted by Miyuki Koshimura and Hidetomo Nabeshima
 - Max-Clique & Max-Ones (from previous evaluations)
 - PseudoBoolean (restructured)
- Industrial
 - Circuit Trace submitted by Yibin Chen and Sean Safarpour
 - Haplotype Assembly submitted by Dan He
 - BCP submitted by Joao Marques-Silva

Random Partial Max-SAT

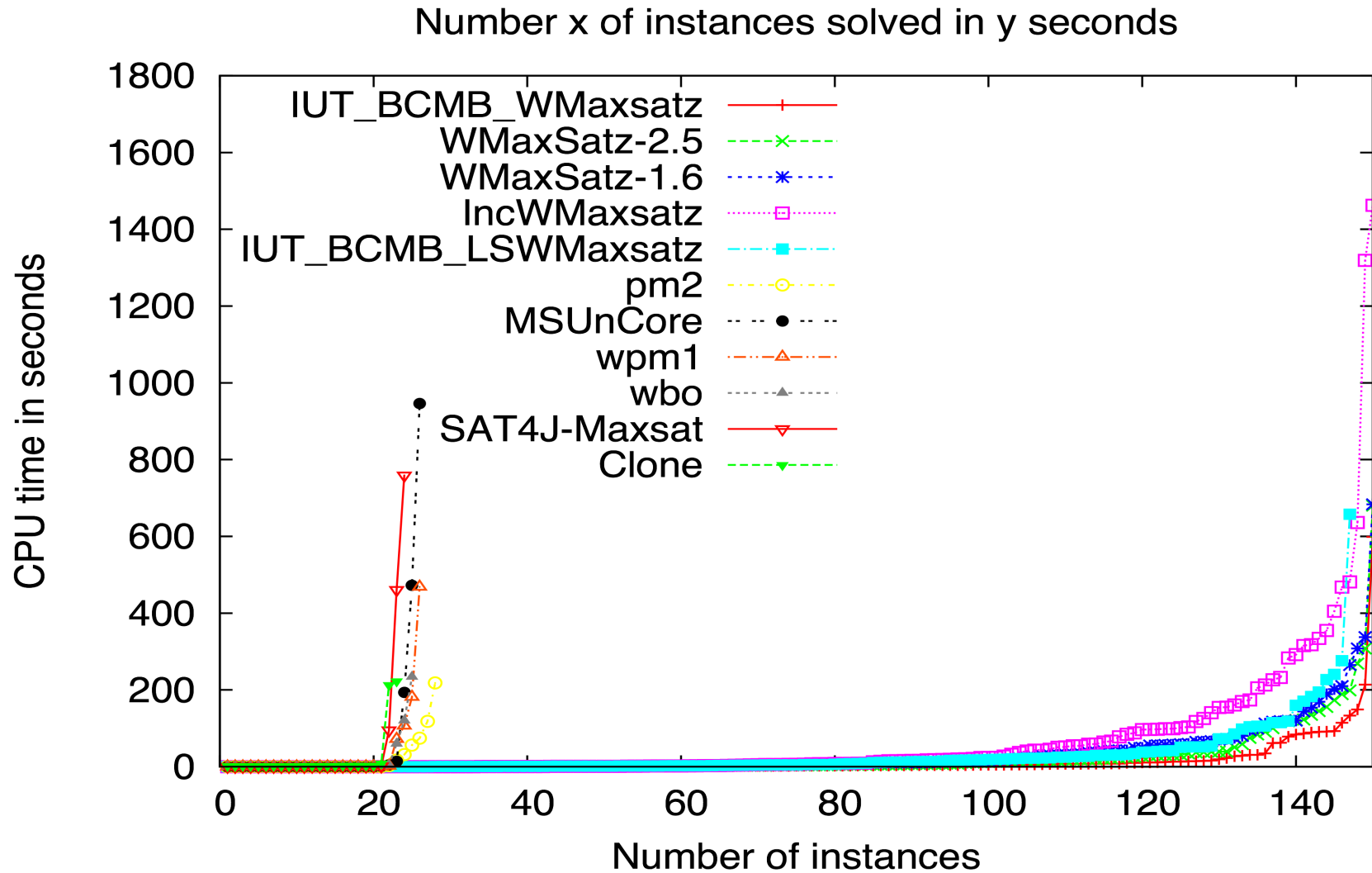
Instance_set	#I	IUT_BCMB_WMaxsatz	WMaxSatz-2.5	WMaxSatz-1.6	IncWMaxsatz	IUT_BCMB_LSWMaxS
pmax2sat/hi/	30	10.30(30)	21.85(30)	52.07(30)	135.07(30)	36.36(30)
pmax2sat/lo/	30	0.73(30)	0.91(30)	1.50(30)	1.88(30)	1.21(29)
pmax2sat/me/	30	4.03(30)	8.95(30)	17.42(30)	30.50(30)	12.07(28)
pmax3sat/hi/	30	68.93(30)	106.16(30)	104.90(30)	195.11(30)	98.47(30)
pmax3sat/lo/	30	0.33(30)	0.69(30)	0.64(30)	0.61(30)	0.61(30)

Solved instances	150	150	150	150	147
------------------	-----	-----	-----	-----	-----

Instance_set	pm2	MSUnCore	wpm1	wbo	SAT4J-Maxsat	Clone
pmax2sat/hi/	0.01(1)	4.65(1)	0.01(1)	3.58(1)	1.43(1)	8.59(1)
pmax2sat/lo/	0.00(0)	0.00(0)	0.00(0)	0.00(0)	0.00(0)	0.00(0)
pmax2sat/me/	0.00(0)	0.00(0)	0.00(0)	0.00(0)	0.00(0)	0.00(0)
pmax3sat/hi/	0.00(0)	0.00(0)	0.00(0)	0.00(0)	0.00(0)	0.00(0)
pmax3sat/lo/	19.17(27)	65.10(25)	33.17(25)	17.29(24)	57.76(23)	21.84(22)

Solved instances	150	28	26	26	25	24	23
------------------	-----	----	----	----	----	----	----

Random Partial Max-SAT



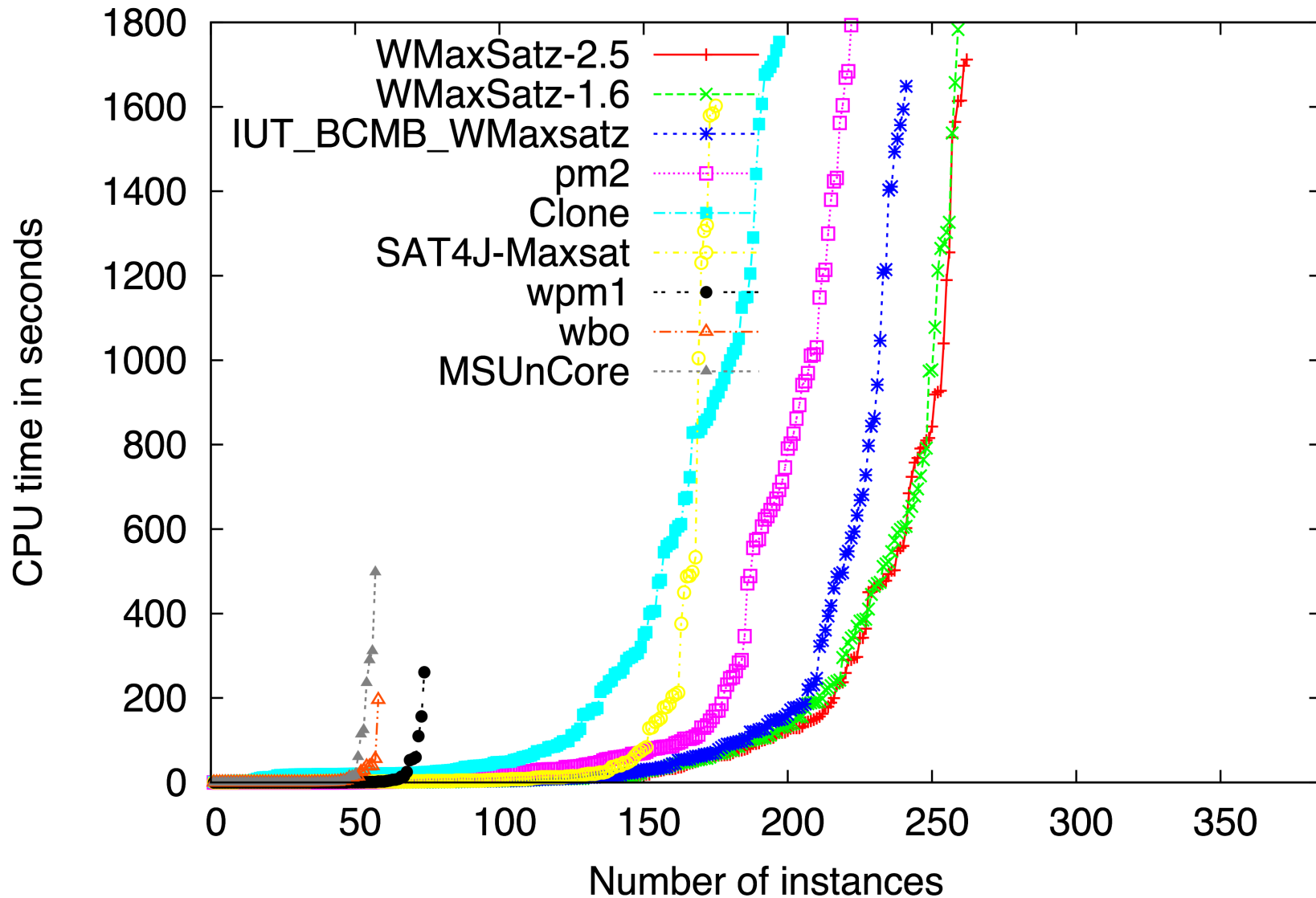
Crafted Partial Max-SAT

Instance_set	#I	WMaxSatz-2.5	WMaxSatz-1.6	IUT_BCMB_WMaxsa	pm2
JobShop/	4	0.00(0)	0.00(0)	0.00(0)	151.78(3)
MAXCLIQUE/RANDOM/	96	74.71(82)	61.44(81)	74.41(82)	178.47(57)
IMAXCLIQUE/STRUCTURED/	62	183.87(24)	164.12(23)	164.27(22)	525.58(17)
MAXONE/3SAT/	80	191.95(77)	183.16(77)	166.78(80)	21.43(80)
MAXONE/STRUCTURED/	60	159.59(58)	139.25(57)	163.84(36)	430.70(41)
PSEUDO/miplib/	4	0.12(2)	0.13(2)	0.18(2)	22.26(4)
frb/	25	0.00(0)	0.00(0)	0.00(0)	896.50(3)
kbtree/	54	256.90(19)	355.85(19)	225.60(19)	121.95(17)
Solved instances		262	259	241	222

Instance_set	Clone	SAT4J-Maxsat	wpm1	wbo	MSUnCore	
JobShop/	0.00(0)	547.54(3)	134.87(2)	98.06(2)	161.76(2)	
MAXCLIQUE/RANDOM/	163.25(81)	162.76(52)	52.26(1)	0.00(0)	0.00(0)	
MAXCLIQUE/STRUCTURED/	209.58(14)	58.39(13)	9.55(10)	15.10(10)	1.44(4)	
MAXONE/3SAT/	473.62(56)	141.42(32)	8.14(45)	3.85(32)	36.63(37)	
MAXONE/STRUCTURED/	264.97(34)	5.71(60)	0.71(2)	0.00(0)	0.00(0)	
PSEUDO/miplib/	383.89(3)	2.57(3)	0.15(2)	0.45(2)	2.35(2)	
frb/	0.00(0)	0.00(0)	0.00(0)	0.00(0)	0.00(0)	
min-enc/kbtree/	201.87(9)	5.58(12)	0.48(12)	1.35(12)	0.32(12)	
Solved instances	385	197	175	74	58	57

Crafted Partial Max-SAT

Number x of instances solved in y seconds



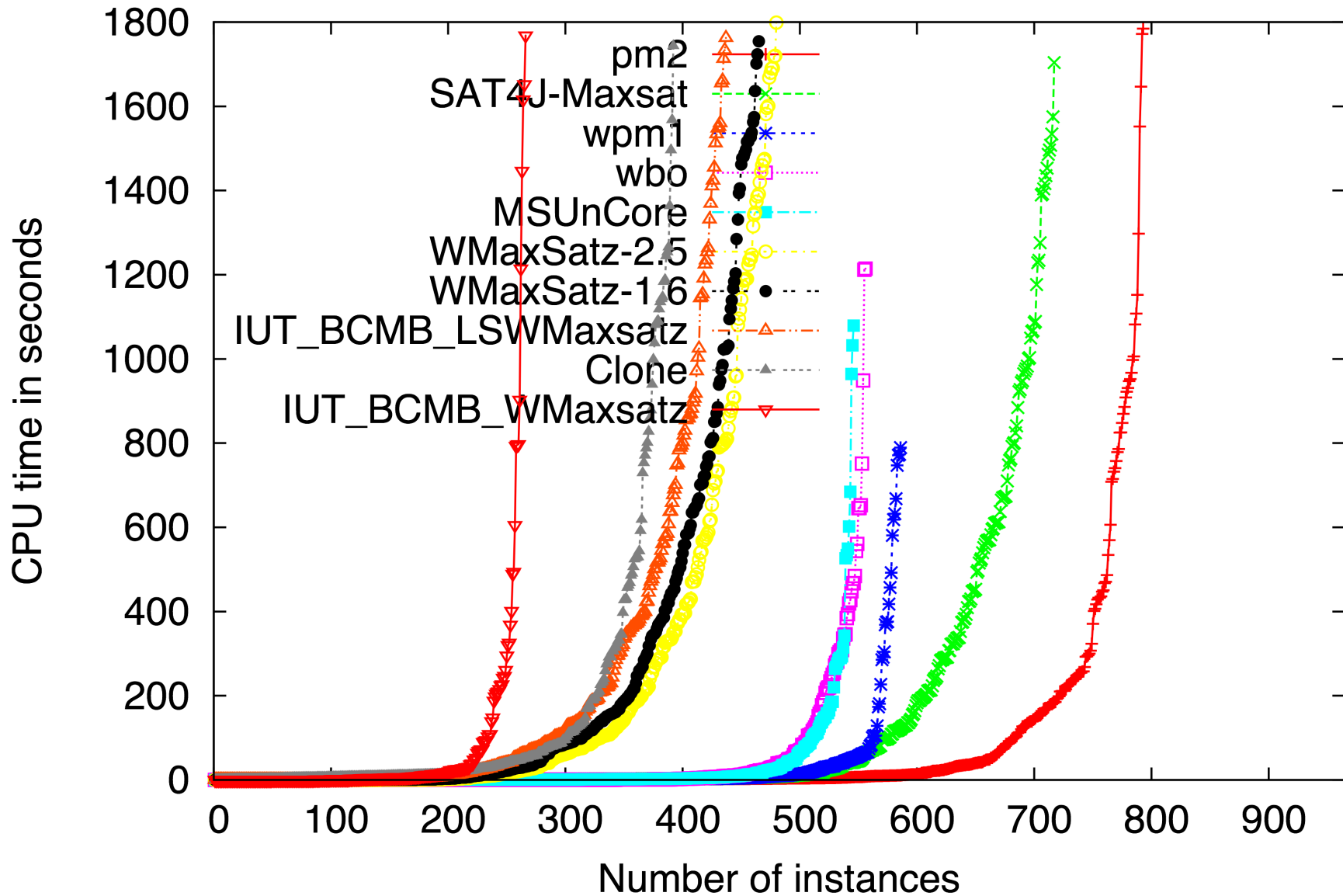
Industrial Partial Max-SAT

Instance_set	#I	pm2	SAT4J-Maxsat	wpm1	wbo	MSUnCore
CircuitTraceCompaction/	4	442.99(3)	431.75(3)	0.00(0)	0.00(0)	0.00(0)
HaplotypeAssembly/	6	34.52(5)	0.00(0)	31.70(5)	9.72(5)	31.52(5)
PROTEIN_INS/	12	56.83(2)	319.63(2)	44.11(1)	11.96(1)	534.08(1)
bcp-fir/	59	13.60(57)	7.99(10)	27.99(56)	112.01(37)	53.11(49)
bcp-hipp-yRa1/SU/	38	101.65(28)	268.15(8)	21.44(11)	109.84(10)	57.08(10)
bcp-hipp-yRa1/simp/	138	8.10(136)	19.95(132)	1.40(130)	3.56(131)	1.35(130)
bcp-msp/	148	91.31(94)	7.54(95)	12.25(42)	45.35(24)	102.03(23)
bcp-mtg/	215	1.36(215)	67.03(196)	6.03(170)	15.67(173)	6.38(166)
bcp-syn/	74	12.64(38)	98.81(20)	5.70(31)	31.76(30)	35.20(32)
pbo-mqc/nencdr/	128	233.02(92)	318.54(114)	82.62(50)	73.63(63)	35.74(48)
pbo-mqc/nlogencdr/	128	148.66(108)	176.42(125)	69.84(75)	76.27(67)	56.44(67)
pbo-routing/	15	1.18(15)	223.31(12)	0.99(15)	0.96(15)	0.63(15)
Solved instances	965	793	717	586	556	546

Instance_set	WMaxSatz-2.5	WMaxSatz-1.6	IUT_BCMB_LSWM	Clone	IUT_BCMB_WM
CircuitTraceCompaction/	0.00(0)	0.00(0)	0.00(0)	0.00(0)	0.00(0)
HaplotypeAssembly/	0.00(0)	0.00(0)	0.00(0)	0.00(0)	0.00(0)
PROTEIN_INS/	0.26(1)	0.22(1)	0.29(1)	26.99(1)	1.49(1)
bcp-fir/	6.99(7)	14.83(7)	7.34(7)	118.32(8)	10.53(7)
bcp-hipp-yRa1/SU/	0.00(0)	0.00(0)	0.00(0)	0.00(0)	0.00(0)
bcp-hipp-yRa1/simp/	218.83(44)	242.21(43)	202.00(44)	105.18(74)	187.72(40)
bcp-msp/	30.18(94)	38.61(94)	30.35(93)	77.38(91)	32.50(90)
bcp-mtg/	118.80(153)	48.11(143)	84.52(119)	45.70(104)	58.06(102)
bcp-syn/	148.71(22)	133.83(22)	139.79(22)	183.55(23)	127.35(24)
pbo-mqc/nencdr/	544.37(59)	597.77(58)	512.29(54)	0.00(0)	0.00(0)
pbo-mqc/nlogencdr/	331.39(95)	383.59(92)	353.89(95)	333.79(86)	0.00(0)
pbo-routing/	5.82(5)	7.27(5)	5.63(2)	10.97(5)	13.64(2)
Solved instances	965	480	465	437	392

Industrial Partial Max-SAT

Number x of instances solved in y seconds



Weighted Max-SAT Category Solvers

- Clone
- IUT_BCMB_WMaxsatz
- IncWMaxSatz
- MSUnCore
- SAT4J-MAXSAT
- W-MaxSatz
- WBO
- WPM1

Weighted Max-SAT Category Benchmarks

- Random
 - Weighted Max-2-SAT & Max-3-SAT instances (restructured)
- Crafted
 - FRB instances provided by Ke Xu
 - Ramsey instances (from previous evaluations)
 - Weighted Max-Cut instances (from previous evaluations)

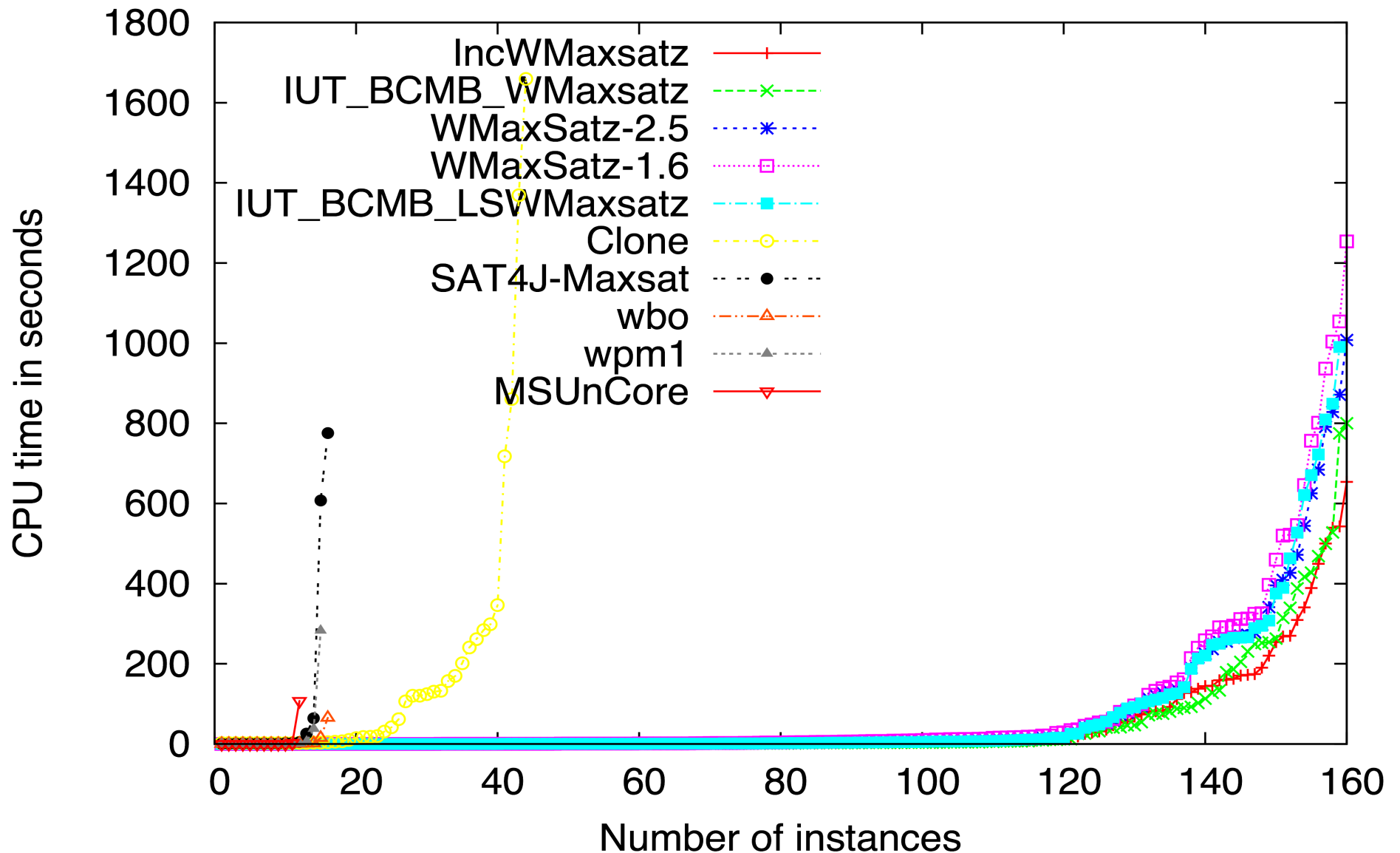
Random Weighted Max-SAT

Instance_set	#I	IncWMaxsatz	IUT_BCMB_WMaxsatz	WMaxSatz-2.5	WMaxSatz-1.6	IUT_BCMB_LSWMax
wmax2sat/hi/	40	4.74(40)	2.43(40)	4.63(40)	9.29(40)	3.57(40)
wmax2sat/lo/	40	0.12(40)	0.25(40)	0.26(40)	0.47(40)	0.21(40)
wmax3sat/hi/	40	187.48(40)	205.45(40)	288.67(40)	338.66(40)	278.44(39)
wmax3sat/lo/	40	2.13(40)	2.43(40)	4.05(40)	4.22(40)	3.82(40)
Solved instances		160	160	160	160	159

Instance_set	Clone	SAT4J-Maxsat	wbo	wpm1	MSUnCore	
wmax2sat/hi/	0.00(0)	0.00(0)	0.00(0)	0.00(0)	0.00(0)	
wmax2sat/lo/	247.26(21)	775.78(1)	16.64(4)	12.80(3)	0.00(0)	
wmax3sat/hi/	0.00(0)	0.00(0)	0.00(0)	0.00(0)	0.00(0)	
wmax3sat/lo/	103.30(23)	47.56(15)	1.36(12)	24.01(12)	9.14(12)	
Solved instances	160	44	16	16	15	12

Random Weighted Max-SAT

Number x of instances solved in y seconds



Crafted Weighted Max-SAT

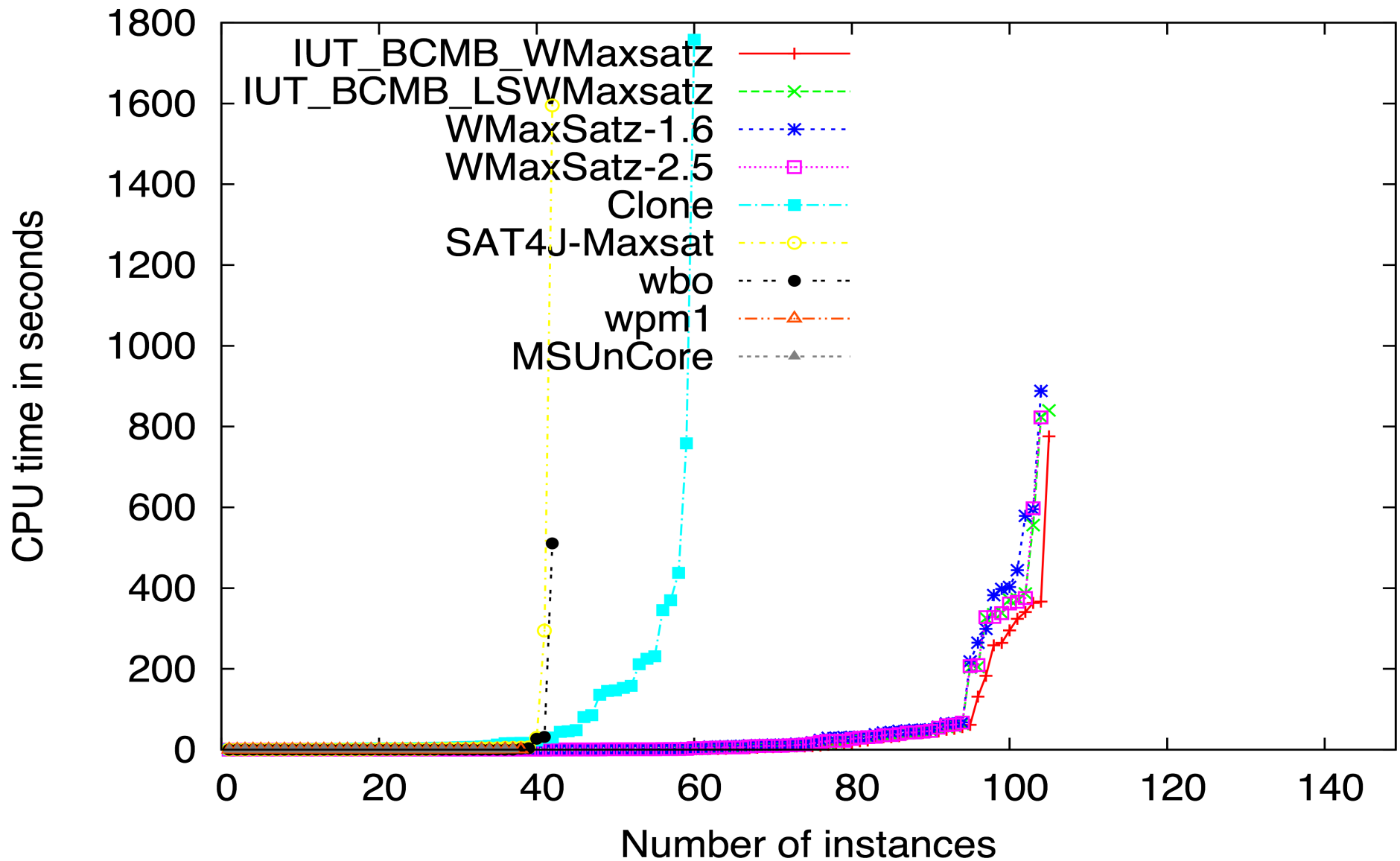
Instance_set	#I	IUT_BCMB_WMaxsatz	IUT_BCMB_LSWMaxsatz	WMaxSatz-1.6	WMaxSatz-2.5
KeXu/frb/	34	21.72(9)	22.37(9)	24.17(9)	21.96(9)
RAMSEY/	48	7.65(37)	38.53(37)	18.41(36)	18.68(36)
WMAXCUT/DIMACS_MOD/	62	62.46(55)	68.16(55)	78.35(55)	67.78(55)
WMAXCUT/SPINGLASS/	5	33.17(4)	53.22(4)	76.96(4)	53.59(4)
Solved instances		105	105	104	104

Instance_set	Clone	SAT4J-Maxsat	wbo	wpm1	MSUnCore
KeXu/frb/	76.66(9)	4.75(4)	142.99(4)	0.00(0)	0.00(0)
RAMSEY/	29.35(27)	54.41(36)	0.06(34)	0.05(34)	0.03(34)
WMAXCUT/DIMACS_MOD/	188.83(22)	0.55(2)	0.01(4)	0.12(4)	0.02(3)
WMAXCUT/SPINGLASS/	3.01(2)	0.00(0)	0.00(0)	0.00(0)	0.00(0)
Solved instances	149	60	42	42	38

37

Crafted Weighted Max-SAT

Number x of instances solved in y seconds



Weighted Partial Max-SAT Category Solvers

- Clone
- IUT_BCMB_WMaxsatz
- IncWMaxSatz
- MSUnCore
- SAT4J-MAXSAT
- W-MaxSatz
- WBO
- WPM1
- W-MaxSatz

Weighted Partial Max-SAT Category Benchmarks

- Random
 - Weighted Partial Max-2-SAT & Max-3-SAT instances (restructured)
- Crafted
 - Auction instances (from previous evaluations)
 - Random Bayesian Network instances provided by Knot Pipatsrisawat
- Industrial
 - Configuration instances provided by Josep Argelich

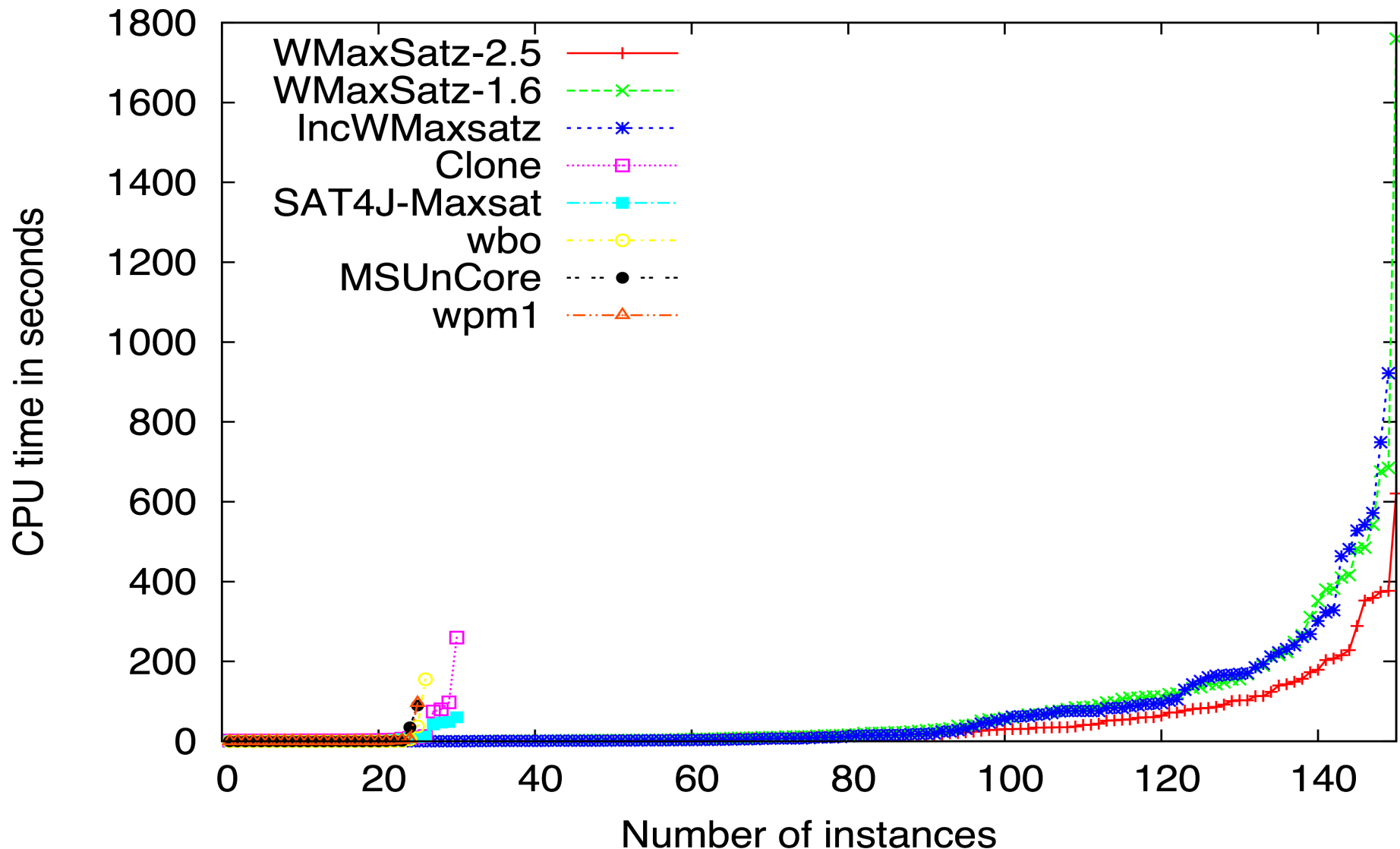
Random Weighted Partial Max-SAT

Instance_set	#l	WMaxSatz-2.5	WMaxSatz-1.6	IncWMaxsatz	Clone
wpmax2sat/hi/	30	77.82(30)	228.65(30)	214.38(29)	8.45(1)
wpmax2sat/lo/	30	2.36(30)	3.82(30)	2.26(30)	0.00(0)
wpmax2sat/me/	30	23.33(30)	52.10(30)	52.77(30)	0.00(0)
wpmax3sat/hi/	30	127.49(30)	137.86(30)	101.17(30)	0.00(0)
wpmax3sat/lo/	30	0.81(30)	0.85(30)	0.42(30)	20.49(29)
Solved instances		150	150	149	30

Instance_set	SAT4J-Maxsat	wbo	MSUnCore	wpm1
wpmax2sat/hi/	1.35(1)	37.01(1)	89.37(1)	0.01(1)
wpmax2sat/lo/	0.00(0)	0.00(0)	0.00(0)	0.00(0)
wpmax2sat/me/	0.00(0)	0.00(0)	0.00(0)	0.00(0)
wpmax3sat/hi/	0.00(0)	0.00(0)	0.00(0)	0.00(0)
wpmax3sat/lo/	8.54(29)	6.45(25)	1.55(24)	4.36(24)
Solved instances	150	30	26	25

Random Weighted Partial Max-SAT

Number x of instances solved in y seconds



Crafted Weighted Partial Max-SAT

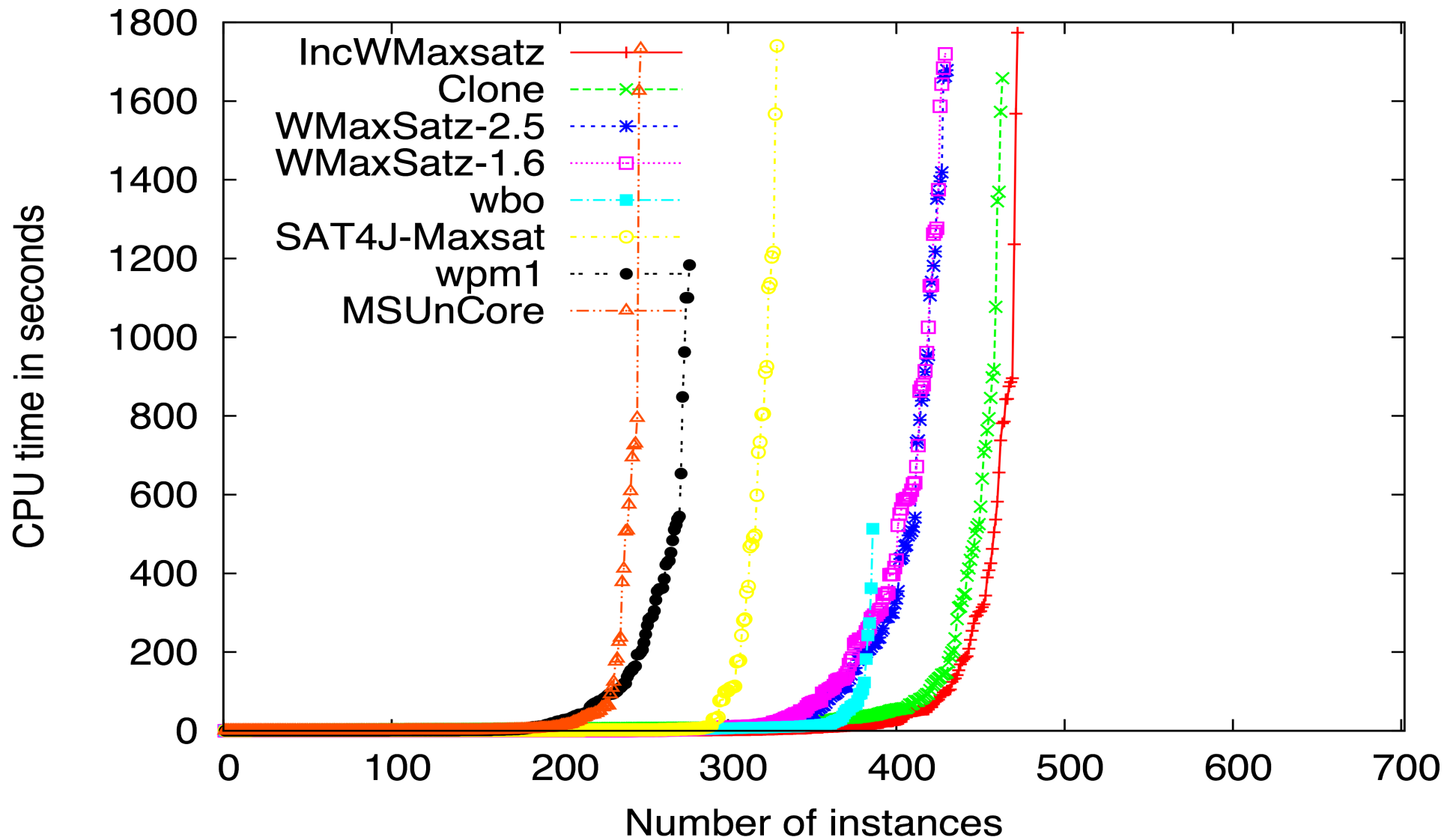
Instance_set	#I	IncWMaxsatz	Clone	WMaxSatz-2.5	WMaxSatz-1.6
AUCTIONS/AUC_PATHS/	88	8.42(88)	32.13(88)	199.62(71)	234.74(71)
AUCTIONS/AUC_SCHEDULING/	84	114.80(82)	189.06(76)	66.74(83)	89.78(83)
KnotPipatsrisawat/	191	196.56(34)	47.05(165)	329.76(21)	284.52(20)
PSEUDO/factor/	186	0.07(186)	7.62(79)	0.17(186)	0.20(186)
PSEUDO/miplib/	12	23.07(3)	4.02(2)	264.14(3)	426.44(3)
QCP/	25	11.29(20)	34.03(15)	164.89(13)	188.81(15)
WCSP/SPOT5/DIR/	21	25.67(4)	55.91(6)	11.79(2)	14.20(2)
WCSP/SPOT5/LOG/	21	0.67(4)	31.04(6)	15.71(2)	18.91(2)
min-enc/planning/	56	96.60(38)	22.01(25)	147.47(48)	124.06(46)
min-enc/warehouses/	18	141.61(13)	1.20(1)	0.32(1)	0.34(1)
Solved instances		472	463	430	429

Instance_set	wbo	SAT4J-Maxsa	wpm1	MSUnCore
AUCTIONS/AUC_PATHS/	0.00(0)	567.98(12)	0.00(0)	0.00(0)
AUCTIONS/AUC_SCHEDULING/	0.00(0)	291.78(38)	0.00(0)	0.00(0)
KnotPipatsrisawat/	13.98(161)	56.58(2)	205.58(87)	128.14(60)
PSEUDO/factor/	7.63(166)	1.15(186)	7.30(120)	29.82(127)
PSEUDO/miplib/	0.00(0)	36.60(3)	0.63(1)	0.09(1)
QCP/	0.04(25)	4.02(25)	0.28(25)	0.13(25)
WCSP/SPOT5/DIR/	1.03(5)	60.85(3)	2.29(5)	13.28(3)
WCSP/SPOT5/LOG/	12.65(6)	96.91(3)	0.51(5)	15.70(4)
min-enc/planning/	0.46(23)	2.69(56)	6.02(28)	2.65(27)
min-enc/warehouses/	0.00(0)	1.10(1)	1.43(6)	0.01(1)
Solved instances	702	386	329	277

248

Crafted Weighted Partial Max-SAT

Number x of instances solved in y seconds



Industrial Weighted Partial Max-SAT

Instance_set	#l	SAT4J-Maxsat	IncWMaxsatz	MSUnCore	wpm1	wbo
up-u98/10/	20	4.77(20)	12.88(20)	13.56(20)	25.17(20)	26.08(20)
up-u98/20/	20	5.11(20)	14.61(20)	15.56(20)	29.57(20)	30.65(20)
up-u98/30/	20	5.27(20)	15.35(20)	17.33(20)	31.45(20)	32.64(20)
up-u98/40/	20	5.32(20)	18.16(20)	18.63(20)	35.28(20)	37.20(20)

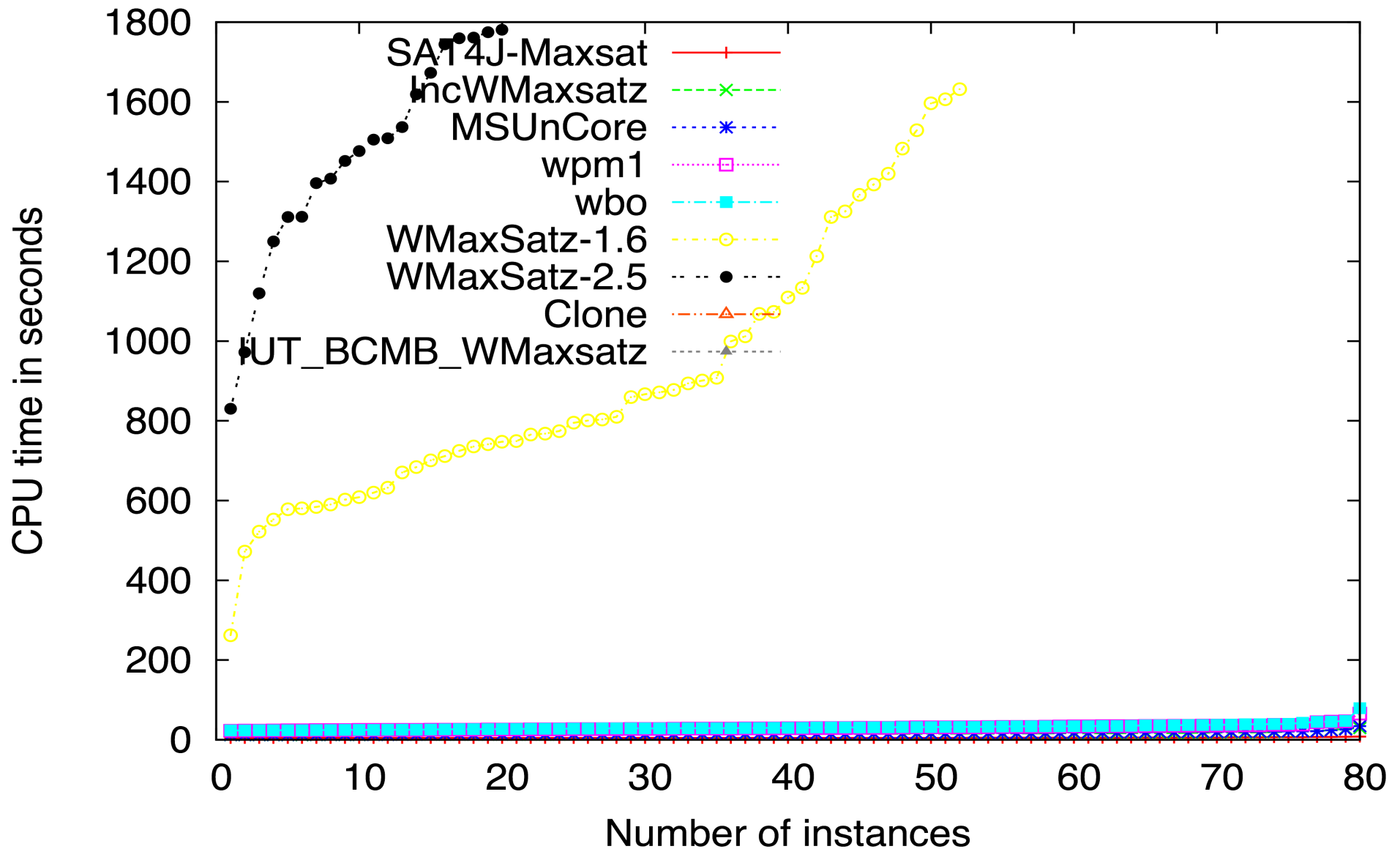
Solved instances 80 80 80 80 80

Instance_set	WMaxSatz-1.6	WMaxSatz-2.5	Clone	IUT_BCMB_WMaxsat
up-u98/10/	824.61(19)	1532.46(12)	0.00(0)	0.00(0)
up-u98/20/	943.86(15)	1480.15(2)	0.00(0)	0.00(0)
up-u98/30/	799.62(9)	1450.66(3)	0.00(0)	0.00(0)
up-u98/40/	1112.42(9)	1162.37(3)	0.00(0)	0.00(0)

Solved instances 80 52 20 0 0

Industrial Weighted Partial Max-SAT

Number x of instances solved in y seconds



Max-SAT Evaluation 2009

Thanks to the people that contributed solvers and benchmarks, and to the Universitat de Lleida for allowing to use its cluster

We encourage you to participate in the Max-SAT Evaluation 2010

