Table 1 Averaged performance obtained by MFEA, TLTLA, SREMTO, MTEA-SaO, MTEA-AD, MFEA-AKT, BLKT-DE, MFMP and MPEF-MRL on complete intersection problems of the CEC2017 benchmarks over 20 independent runs.

Algorithm	Index	CI-HS		CI-MS		CI-LS		Summary
		T1	T2	T1	T2	T1	T2	† /≈/ -
MFEA	mean	7.52E-04 -	6.66E+01 -	5.47E-01 -	7.44E+01 -	2.01E+01 -	1.92E+03 -	0/0/6
	std	2.34E-03	2.68E+01	7.12E-01	4.85E+01	6.50E-02	3.43E+02	
TLTLA	mean	6.43E-10 -	1.02E-06 -	1.05E-05 -	3.71E+00 -	1.90E-06 -	**6.36E-04** ≈	0/1/5
	std	1.37E-09	2.15E-06	4.68E-05	1.66E+01	6.27E-06	4.79E-09	
SREMTO	mean	4.63E-01 -	5.98E+02 -	2.00E+01 -	6.29E+02 -	2.01E+01 -	1.85E+03 -	0/0/6
	std	5.37E-02	1.42E+02	6.22E-02	9.90E+01	3.33E-02	3.78E+02	
MTEA-SaO	mean	7.50E-04 -	8.04E+00 -	1.69E-04 -	4.85E-05 -	2.12E+01 -	1.77E+03 -	0/0/6
	std	2.30E-03	2.52E+01	1.46E-04	1.25E-04	4.14E-02	3.12E+02	
MTEA-AD	mean	1.15E-06 -	1.64E-03 -	4.10E-06 -	6.46E-08 -	1.01E+01 -	4.09E+02 -	0/0/6
	std	1.59E-06	2.31E-03	9.18E-06	2.77E-07	1.03E+01	4.32E+02	
MFEA-AKT	mean	8.84E-04 -	8.01E+01 -	1.06E+00 -	9.19E+01 -	2.01E+01 -	1.96E+03 -	0/0/6
	std	2.68E-03	2.64E+01	7.56E-01	4.73E+01	6.98E-02	3.32E+02	
BLKT-DE	mean	7.95E-06 -	8.86E+01 -	3.22E-04 -	9.70E+01 -	2.09E+01 -	4.11E+03 -	0/0/6
	std	7.40E-06	3.09E+01	3.61E-04	3.13E+01	3.76E-01	2.46E+03	
MFMP	mean	**0.00E+00** ≈	**0.00E+00** ≈	4.92E-12 -	9.83E-07 -	2.08E+01 -	9.76E+02 -	0/2/4
	std	0.00E+00	0.00E+00	1.50E-11	3.11E-06	1.05E-01	1.63E+02	
MPEF-MRL	mean	**0.00E+00**	**0.00E+00**	**1.33E-15**	**0.00E+00**	**3.21E-14**	**6.36E-04**	Base
	std	0.00E+00	0.00E+00	2.16E-15	0.00E+00	5.40E-15	2.21E-11	

Table 2 Averaged performance obtained by MFEA, TLTLA, SREMTO, MTEA-SaO, MTEA-AD, MFEA-AKT, BLKT-DE, MFMP and MPEF-MRL on partial intersection problems of the CEC2017 benchmarks over 20 independent runs.

Algorithm	Index	PI-HS		PI-MS		PI-LS		Summary
		T1	T2	T1	T2	T1	T2	† /≈/ -
MFEA	mean	2.02E+02 -	1.81E-12 -	1.04E-06 -	8.93E+01 -	1.20E+01 -	1.08E+01 -	0/0/6
	std	6.37E+01	1.97E-12	1.44E-06	4.98E+00	1.00E+01	9.49E+00	
TLTLA	mean	**3.15E+00** †	1.08E-11 -	4.40E-02 -	**1.66E+01** †	8.97E-03 -	2.59E-02 -	2/0/4
	std	7.87E+00	1.05E-11	1.97E-01	2.14E+01	3.03E-02	3.87E-02	
SREMTO	mean	6.04E+02 -	1.62E+01 -	2.00E+01 -	1.45E+03 -	2.00E+01 -	2.06E+01 -	0/0/6
	std	1.15E+02	4.07E+00	4.43E-02	3.78E+02	6.94E-02	2.89E+00	
MTEA-SaO	mean	8.78E+01 †	7.13E-08 -	3.23E-04 -	8.46E+01 -	1.52E-04 -	8.49E-03 -	1/0/5
	std	4.26E+01	5.55E-08	1.60E-04	1.45E+01	8.57E-05	4.61E-03	
MTEA-AD	mean	3.55E+02 -	2.40E-09 -	1.23E-05 -	8.61E+01 -	2.54E-05 -	1.21E-03 -	0/0/6
	std	1.37E+01	9.68E-10	1.99E-06	8.96E-01	7.49E-06	1.14E-03	
MFEA-AKT	mean	1.75E+02 -	3.34E-13 -	2.05E+00 -	1.03E+02 -	3.43E-01 -	5.33E-01 -	0/0/6
	std	4.61E+01	2.84E-13	6.86E-01	4.07E+01	5.45E-01	8.80E-01	
BLKT-DE	mean	1.09E+02 †	2.35E-06 -	5.83E-04 -	4.58E+01 -	1.48E-03 -	2.53E+00 -	1/0/5
	std	3.40E+01	4.13E-06	2.85E-04	4.55E-01	3.82E-03	2.05E+00	
MFMP	mean	1.44E+02 -	1.13E-21 -	4.27E-11 -	7.18E+01 -	4.12E-11 -	**1.99E-18** ≈	0/1/5
	std	9.83E+00	4.18E-22	7.61E-11	9.42E-01	1.09E-10	0.00E+00	
MPEF-MRL	mean	1.36E+02	**4.76E-27**	**1.10E-14**	1.97E+01	**4.44E-16**	**1.99E-18**	Base
	std	1.15E+01	7.92E-27	6.33E-15	1.11E+01	0.00E+00	1.95E-33	

Table 3 Averaged performance obtained by MFEA, TLTLA, SREMTO, MTEA-SaO, MTEA-AD, MFEA-AKT, BLKT-DE, MFMP and MPEF-MRL on no intersection problems of the CEC2017 benchmarks over 20 independent runs.

Algorithm	Index	NI-HS		NI-MS		NI-LS		Summary
		T1	T2	T1	T2	T1	T2	† /≈/ -
MFEA	mean	8.87E+01 -	8.24E+01 -	3.24E-03 -	1.36E+01 -	2.00E+02 -	1.95E+03 †	1/0/5
	std	4.08E+01	3.21E+01	5.20E-03	2.70E+00	3.48E+01	2.03E+02	
TLTLA	mean	4.26E+01 -	5.11E+00 -	3.49E-06 -	1.16E+00 -	**1.30E+01** †	**2.07E+02** †	2/0/4
	std	1.39E+01	1.28E+01	7.99E-06	1.36E+00	2.61E+01	3.48E+02	
SREMTO	mean	1.30E+03 -	6.08E+02 -	4.69E-01 -	4.84E+01 -	6.47E+02 -	2.06E+03 †	1/0/5
	std	3.75E+02	9.02E+01	6.12E-02	3.46E+00	1.28E+02	3.20E+02	
MTEA-SaO	mean	8.89E+01 -	6.01E+01 -	2.15E-05 -	8.94E+00 -	7.84E+01 †	1.60E+03 †	2/0/4
	std	4.55E+01	4.11E+01	1.03E-05	5.24E+00	1.84E+01	3.22E+02	
MTEA-AD	mean	7.95E+01 -	1.44E+01 -	3.99E-04 -	7.57E-01 -	3.56E+02 -	6.38E+02 †	1/0/5
	std	4.14E+01	1.06E+01	1.65E-03	5.44E-01	1.34E+01	2.96E+02	
MFEA-AKT	mean	8.75E+01 -	1.27E+02 -	1.74E-03 -	9.43E+00 -	1.82E+02 -	1.96E+03 †	1/0/5
	std	3.87E+01	4.35E+01	3.59E-03	1.67E+00	5.02E+01	3.58E+02	
BLKT-DE	mean	4.52E+01 -	1.08E+02 -	1.10E-05 -	1.49E-01 -	1.37E+02 †	1.06E+03 †	2/0/4
	std	7.71E-01	3.91E+01	1.27E-05	5.34E-02	4.67E+01	7.16E+02	
MFMP	mean	3.17E+01 -	8.81E-01 -	1.01E-15 -	5.78E-01 -	1.55E+02 -	1.16E+03 †	1/0/5
	std	1.14E+00	2.79E+00	2.03E-15	5.89E-01	2.09E+01	2.76E+02	
MPEF-MRL	mean	**2.67E+01**	**0.00E+00**	**0.00E+00**	**3.72E-02**	1.49E+02	3.67E+03	Base
	std	1.24E+00	0.00E+00	0.00E+00	2.81E-02	1.30E+01	2.20E+02	

Table 4 Average ranking algorithms of the algorithms on CEC2017 benchmarks. (Friedman)

Problems	CI + HS & MS & LS			PI + HS & MS & LS			NI + HS & MS & LS		
Algorithm	Ave rank	Std rank	Over rank	Ave rank	Std rank	Over rank	Ave rank	Std rank	Over rank
MFEA	6.3333	6.8333	6	6.1667	6.1667	7	7	5.5	7
TLTLA	3.0833	3.1667	3	4.1667	5.3333	4	2.6667	4.6667	3
SREMTO	7.8333	7.3333	9	9	8.1667	9	8.8333	8.1667	9
MTEA-SaO	5.6667	4.6667	5	4.5	5.3333	5	5.1667	6.1667	6
MTEA-AD	3.1667	5	4	5	3.6667	3	4.8333	4.1667	5
MFEA-AKT	7.1667	6.8333	7	6.3333	6.8333	8	6.8333	7	8
BLKT-DE	7.3333	7	8	5.3333	5.3333	6	3.8333	5	4
MFMP	3.1667	3	2	2.6667	2	2	2.9167	2.75	2
MPEF-MRL	1.25	1.1667	1	1.8333	2.1	1	2.9167	1.5833	1

Table 5 Averaged performance obtained by MFEA, TLTLA, SREMTO, MTEA-SaO, and MPEF-MRL on the WCCI20-MTSO benchmarks over 20 independent runs.

		MFEA	TLTLA	SREMTO	MTEA-SaO	MPEF-MRL
P1	T1	6.42E+02 -	6.14E+02 -	6.49E+02 -	6.16E+02 -	**6.00E+02**
	T2	6.44E+02 -	6.17E+02 -	6.50E+02 -	6.14E+02 -	**6.00E+02**
P2	T1	7.01E+02 -	7.00E+02 ≈	7.01E+02 -	7.00E+02 ≈	**7.00E+02**
	T2	7.01E+02 -	7.00E+02 ≈	7.01E+02 -	7.00E+02 ≈	**7.00E+02**
P3	T1	1.33E+06 -	1.94E+06 -	3.22E+06 -	6.60E+05 -	**4.21E+03**
	T2	1.33E+06 -	1.92E+06 -	2.94E+06 -	6.02E+05 -	**4.27E+03**
P4	T1	1.30E+03 ≈	1.30E+03 ≈	1.30E+03 ≈	1.30E+03 ≈	**1.30E+03**
	T2	1.30E+03 ≈	1.30E+03 ≈	1.30E+03 ≈	1.30E+03 ≈	**1.30E+03**
P5	T1	1.55E+03 -	1.52E+03 ≈	1.55E+03 -	**1.51E+03** †	1.52E+03
	T2	1.55E+03 -	1.52E+03 ≈	1.55E+03 -	1.52E+03 ≈	**1.52E+03**
P6	T1	7.93E+05 -	8.28E+05 -	1.58E+06 -	4.61E+05 -	**5.10E+03**
	T2	8.62E+05 -	9.09E+05 -	1.42E+06 -	2.70E+05 -	**4.62E+03**
P7	T1	3.17E+03 -	3.10E+03 -	3.06E+03 -	2.92E+03 -	**2.39E+03**
	T2	3.00E+03 -	3.25E+03 -	3.30E+03 -	2.97E+03 -	**2.42E+03**
P8	T1	**5.20E+02** †	5.20E+02 †	5.20E+02 †	5.21E+02 ≈	5.21E+02
	T2	**5.20E+02** †	5.20E+02 †	5.20E+02 †	5.21E+02 ≈	5.21E+02
P9	T1	**7.66E+03** †	8.01E+03 †	7.72E+03 †	8.87E+03 †	9.61E+03
	T2	1.62E+03 ≈	1.62E+03 ≈	1.62E+03 ≈	1.62E+03 ≈	**1.62E+03**
P10	T1	2.14E+04 -	2.42E+04 -	1.89E+04 -	1.75E+04 -	**2.16E+03**
	T2	9.98E+05 -	1.35E+06 -	1.99E+06 -	5.42E+05 -	**4.97E+03**
† /≈/ -		3/3/14	3/7/10	3/3/14	2/8/10	Base

Table 6 Averaged performance obtained by MTEA-AD, MFEA-AKT, BLKT-DE, MFMP and MPEF-MRL on the WCCI20-MTSO benchmarks over 20 independent runs.

		MTEA-AD	MFEA-AKT	BLKT-DE	MFMP	MPEF-MRL
P1	T1	6.01E+02 -	6.12E+02 -	6.07E+02 -	6.01E+02 -	**6.00E+02**
	T2	6.01E+02 -	6.13E+02 -	6.08E+02 -	6.01E+02 -	**6.00E+02**
P2	T1	7.00E+02 ≈	7.00E+02 ≈	7.00E+02 ≈	7.00E+02 ≈	**7.00E+02**
	T2	7.00E+02 ≈	7.00E+02 ≈	7.00E+02 ≈	7.00E+02 ≈	**7.00E+02**
P3	T1	1.81E+06 -	2.32E+05 -	1.73E+06 -	5.59E+03 -	**4.21E+03**
	T2	1.87E+06 -	3.04E+05 -	1.34E+06 -	5.20E+03 -	**4.27E+03**
P4	T1	1.30E+03 ≈	1.30E+03 ≈	1.30E+03 ≈	1.30E+03 ≈	**1.30E+03**
	T2	1.30E+03 ≈	1.30E+03 ≈	1.30E+03 ≈	1.30E+03 ≈	**1.30E+03**
P5	T1	1.53E+03 -	1.52E+03 ≈	1.53E+03 -	1.52E+03 ≈	**1.52E+03**
	T2	1.53E+03 -	1.52E+03 ≈	1.53E+03 -	1.52E+03 ≈	**1.52E+03**
P6	T1	1.49E+06 -	6.84E+05 -	7.48E+05 -	7.77E+03 -	**5.10E+03**
	T2	1.21E+06 -	5.74E+05 -	7.48E+05 -	6.76E+03 -	**4.62E+03**
P7	T1	2.80E+03 -	2.95E+03 -	2.95E+03 -	2.46E+03 -	**2.39E+03**
	T2	2.82E+03 -	3.02E+03 -	3.06E+03 -	2.44E+03 -	**2.42E+03**
P8	T1	**5.20E+02** †	5.20E+02 †	5.21E+02 ≈	5.21E+02 ≈	5.21E+02
	T2	**5.20E+02** †	5.20E+02 †	5.21E+02 ≈	5.21E+02 ≈	5.21E+02
P9	T1	9.13E+03 †	8.21E+03 †	**8.06E+03** †	8.85E+03 +	9.61E+03
	T2	1.62E+03 ≈	1.62E+03 ≈	1.62E+03 ≈	1.62E+03 ≈	**1.62E+03**
P10	T1	2.82E+04 -	2.22E+04 -	3.41E+04 -	2.23E+03 -	**2.16E+03**
	T2	1.72E+06 -	1.57E+06 -	1.26E+06 -	**2.23E+03** †	4.97E+03
† /≈/ -		3/5/12	3/7/10	1/7/12	4/6/10	Base

Table 7 Averaged performance obtained by MFEA, MaTDE, MTEA-AD, KR-MTEA, BoKT-DE, SBGA, TRADE, MFMP and MPEF-MRL on the WCCI20-MaTSO benchmarks over 20 independent runs.

		MFEA	MaTDE	MTEA-AD	KR-MTEA	BoKTDE	SBGA	TRADE	MFMP	MPEF-MRL
P1	T1	9.30E-01 -	9.79E-07 -	2.42E-06 -	1.88E-03 -	9.00E-09 -	3.60E-02 -	8.99E-14 -	8.48E-17 -	**1.53E-25**
	T2	8.63E-01 -	1.46E-06 -	1.38E-06 -	1.05E-05 -	3.19E-07 -	3.69E-02 -	6.25E-14 -	9.79E-17 -	**1.23E-25**
	T3	1.08E+00 -	1.55E-06 -	1.55E-06 -	2.48E-03 -	2.65E-07 -	3.80E-02 -	1.04E-13 -	8.38E-17 -	**1.19E-25**
	T4	9.98E-01 -	1.49E-06 -	1.97E-06 -	1.03E-05 -	5.57E-10 -	3.70E-02 -	5.83E-14 -	9.38E-17 -	**1.37E-25**
	T5	8.63E-01 -	9.61E-07 -	1.69E-06 -	1.69E-03 -	6.09E-14 -	4.75E-02 -	8.19E-14 -	1.95E-16 -	**1.46E-25**
	T6	1.01E+00 -	1.16E-06 -	1.69E-06 -	6.35E-06 -	1.85E-05 -	3.40E-02 -	1.01E-13 -	7.33E-17 -	**9.93E-25**
	T7	1.06E+00 -	1.50E-06 -	1.72E-06 -	2.00E-03 -	2.55E-09 -	4.24E-02 -	1.03E-13 -	9.50E-17 -	**1.80E-25**
P2	T1	2.06E+03 -	1.15E+02 -	2.41E+02 -	5.27E+01 -	9.58E+01 -	1.05E+03 -	2.07E+02 -	5.82E+01 -	**4.38E+01**
	T2	8.98E+02 -	2.96E+02 -	4.85E+02 -	6.24E+01 -	2.04E+02 -	3.53E+02 -	2.23E+02 -	9.11E+01 -	**4.56E+01**
	T3	2.33E+03 -	1.84E+02 -	2.12E+02 -	1.21E+02 -	1.60E+02 -	2.23E+02 -	8.55E+01 -	7.74E+01 -	**4.39E+01**
	T4	1.56E+03 -	1.59E+02 -	3.52E+02 -	**4.77E+01**†	9.61E+01 -	5.17E+02 -	8.43E+01 -	5.09E+01 -	4.82E+01
	T5	1.16E+03 -	2.01E+02 -	1.38E+02 -	8.21E+01 -	1.51E+02 -	2.21E+02 -	1.35E+02 -	8.05E+01 -	**4.70E+01**
	T6	9.12E+02 -	9.14E+01 -	1.13E+02 -	4.80E+01 -	1.04E+02 -	2.42E+02 -	1.87E+02 -	5.78E+01 -	**4.48E+01**
	T7	2.42E+03 -	1.06E+02 -	1.45E+02 -	5.48E+01 -	1.86E+02 -	1.94E+02 -	2.33E+02 -	7.21E+01 -	**4.35E+01**
P3	T1	3.36E+02 -	2.90E+02 -	3.32E+02 -	**1.03E+02**†	3.35E+02 -	2.86E+02 -	2.89E+02 -	1.61E+02 -	1.46E+02
	T2	3.22E+02 -	2.68E+02 -	2.89E+02 -	3.94E+02 -	3.35E+02 -	2.29E+02 -	2.83E+02 -	1.56E+02 -	**1.43E+02**
	T3	3.64E+02 -	2.83E+02 -	3.46E+02 -	**1.21E+02**†	3.30E+02 -	1.95E+02 -	2.87E+02 -	1.59E+02 -	1.46E+02
	T4	3.30E+02 -	2.83E+02 -	3.29E+02 -	3.90E+02 -	3.36E+02 -	2.08E+02 -	2.81E+02 -	**1.47E+02**†	1.49E+02
	T5	3.25E+02 -	2.86E+02 -	3.48E+02 -	**1.27E+02**†	3.34E+02 -	2.76E+02 -	2.87E+02 -	1.53E+02 -	1.44E+02
	T6	3.53E+02 -	2.93E+02 -	3.00E+02 -	3.92E+02 -	3.35E+02 -	2.65E+02 -	2.96E+02 -	1.62E+02 -	**1.50E+02**
	T7	3.14E+02 -	2.75E+02 -	3.54E+02 -	**1.04E+02**†	3.36E+02 -	2.51E+02 -	3.00E+02 -	1.65E+02 -	1.47E+02
P4	T1	1.29E+00 -	4.66E-06 -	4.55E-05 -	5.72E-03 -	2.68E-19 -	4.19E-02 -	1.79E-13 -	3.40E-16 -	**1.37E-25**
	T2	4.99E+03 -	1.20E+02 -	1.38E+02 -	4.84E+01 -	2.47E+03 -	1.28E+03 -	7.56E+01 -	5.12E+01 -	**4.26E+01**
	T3	4.16E+00 -	2.66E+00 -	1.22E-02 -	9.69E-02 -	8.85E-05 -	1.05E+00 -	3.42E-07 -	1.22E-09 -	**2.52E-14**
	T4	1.08E+00 †	6.20E-06 †	4.84E-05 †	2.02E-05 †	1.91E-13 †	2.79E-02 †	9.67E-14 †	**1.31E-16**†	4.32E+01
	T5	1.08E+04 -	1.87E+02 -	3.79E+02 -	6.46E+01 -	1.10E+03 -	4.25E+03 -	5.99E+01 -	**4.52E+01**†	4.59E+01
	T6	4.20E+00 -	2.71E+00 -	2.38E-02 -	4.57E-03 -	2.09E-09 -	5.75E-01 -	6.61E-07 -	4.69E-09 -	**8.10E-12**
	T7	1.27E+00 -	5.11E-06 -	8.59E-05 -	6.60E-03 -	7.63E-13 -	4.12E-02 -	1.16E-13 -	2.47E-16 -	**3.11E-24**
P5	T1	4.47E+02 -	3.45E+02 -	3.65E+02 -	1.94E+02 -	2.41E+02 -	2.97E+02 -	2.97E+02 -	1.62E+02 -	**1.49E+02**
	T2	2.17E-01 -	5.28E-03 -	2.25E-03 -	2.26E-02 -	3.89E-07 -	2.85E-02 -	1.86E-07 -	9.86E-04 -	**0.00E+00**
	T3	4.48E+01 -	1.55E+01 -	3.01E+00 -	4.23E+00 -	1.59E+00 -	8.81E+00 -	2.14E+00 -	2.38E+00 -	**1.24E+00**
	T4	4.99E+02 -	3.54E+02 -	3.74E+02 -	4.12E+02 -	3.03E+02 -	2.39E+02 -	3.03E+02 -	1.63E+02 -	**1.49E+02**
	T5	1.98E-01 -	5.69E-03 -	2.95E-03 -	1.38E-02 -	9.91E-07 -	3.60E-02 -	1.53E-07 -	1.23E-03 -	**0.00E+00**
	T6	4.13E+01 -	1.50E+01 -	2.95E+00 -	1.83E+00 -	**1.24E+00**†	8.27E+00 -	2.02E+00 -	1.48E+00 †	1.54E+00
	T7	5.04E+02 -	3.60E+02 -	3.60E+02 -	**1.25E+02**†	2.94E+02 -	2.00E+02 -	3.01E+02 -	1.63E+02 -	1.53E+02
P6	T1	3.80E+03 -	2.92E+02 -	1.67E+02 -	2.95E+02 -	1.77E+02 -	7.90E+02 -	7.85E+01 -	5.69E+01 -	**4.48E+01**
	T2	1.97E-01 -	7.92E-03 -	2.96E-03 -	6.34E-03 -	1.40E-06 -	3.79E-02 -	5.19E-06 -	7.40E-04 -	**0.00E+00**
	T3	7.86E+03 †	1.41E+04 -	8.58E+03 -	**6.99E+03**†	1.35E+04 -	7.10E+03 †	1.22E+04 -	9.98E+03 -	7.97E+03
	T4	3.13E+04 -	1.40E+02 -	1.19E+02 -	6.52E+01 -	6.03E+02 -	8.70E+02 -	1.94E+02 -	4.99E+01 -	**4.31E+01**
	T5	2.13E-01 -	5.39E-03 -	2.37E-03 -	1.29E-02 -	3.59E-06 -	3.96E-02 -	2.64E-07 -	5.72E-14 -	**0.00E+00**
	T6	7.68E+03 †	1.41E+04 -	8.56E+03 -	1.49E+04 -	1.35E+04 -	**7.42E+03**†	1.30E+04 -	9.76E+03 -	7.85E+03
	T7	3.72E+03 -	1.28E+02 -	2.42E+02 -	2.21E+02 -	1.55E+02 -	6.57E+02 -	1.16E+02 -	5.12E+01 -	**4.43E+01**

Table 7 (continued)

		MFEA	MaTDE	MTEA-AD	KR-MTEA	BoKTDE	SBGA	TRADE	MFMP	MPEF-MRL
P7	T1	4.48E+00 -	2.56E+00 -	2.05E-02 -	6.55E-02 -	8.83E-06 -	1.87E-01 -	7.24E-07 -	3.43E-10 -	**1.65E-14**
	T2	4.99E+02 -	3.30E+02 -	3.53E+02 -	4.00E+02 -	1.89E+02 -	1.82E+02 -	2.96E+02 -	1.56E+02 -	**1.50E+02**
	T3	4.20E+01 -	1.74E+01 -	3.94E+00 -	6.37E+00 -	**9.57E-01**†	8.46E+00 -	2.17E+00 -	2.38E+00 -	1.63E+00
	T4	4.45E+00 -	2.69E+00 -	3.78E-03 -	7.68E-04 -	1.35E-04 -	4.89E-01 -	1.18E-06 -	7.86E-09 -	**2.04E-14**
	T5	4.40E+02 -	3.47E+02 -	3.54E+02 -	**1.37E+02**†	1.66E+02 -	2.89E+02 -	2.97E+02 -	1.67E+02 -	1.52E+02
	T6	4.54E+01 -	1.51E+01 -	3.48E+00 -	1.86E+00 -	**8.79E-01**†	1.25E+01 -	2.66E+00 -	2.18E+00 -	1.35E+00
	T7	3.98E+00 -	2.67E+00 -	1.67E-02 -	1.01E-01 -	4.72E-12 -	4.14E-01 -	1.49E-06 -	2.04E-10 -	**1.68E-14**
P8	T1	1.27E+04 -	2.70E+02 -	2.33E+02 -	3.75E+02 -	2.48E+02 -	2.78E+02 -	1.37E+02 -	4.99E+01 -	**4.37E+01**
	T2	1.85E+01 -	2.82E+00 -	6.10E-03 -	3.91E-03 -	9.13E-05 -	7.64E-01 -	2.30E-01 -	2.03E-01 -	**2.23E-14**
	T3	4.50E+02 -	3.93E+02 -	3.71E+02 -	2.54E+02 -	**6.80E+01**†	1.99E+02 -	3.12E+02 -	1.69E+02 -	1.50E+02
	T4	1.98E-01 -	1.20E-02 -	2.93E-03 -	4.36E-02 -	1.67E-03 -	2.66E-02 -	4.27E-07 -	3.58E-13 -	**0.00E+00**
	T5	5.16E+01 -	2.33E+01 -	3.81E+00 -	7.72E+00 -	**2.77E+00**†	1.35E+01 -	6.15E+00 -	4.09E+00 -	3.61E+00
	T6	1.14E+04 -	2.63E+02 -	3.46E+02 -	4.83E+01 -	2.93E+03 -	2.29E+04 -	1.04E+02 -	4.99E+01 -	**4.29E+01**
	T7	1.84E+01 -	2.72E+00 -	5.53E-03 -	3.68E-01 -	1.29E-09 -	5.67E-01 -	1.15E-01 -	5.81E-09 -	**1.60E-14**
P9	T1	4.39E+03 -	3.89E+02 -	7.70E+02 -	6.45E+02 -	5.40E+02 -	1.55E+02 -	3.14E+02 -	1.77E+02 -	**1.34E+02**
	T2	2.00E+01 -	2.57E+00 -	1.61E-02 -	4.91E-03 -	1.66E-09 -	3.78E-01 -	1.09E-01 -	2.11E-10 -	**2.04E-14**
	T3	4.97E+02 -	3.80E+02 -	3.75E+02 -	2.79E+02 -	**7.23E+01**†	2.31E+02 -	3.02E+02 -	1.71E+02 -	1.53E+02
	T4	2.26E-01 -	1.22E-02 -	4.19E-03 -	2.16E-02 -	1.70E-03 -	3.69E-02 -	3.70E-04 -	1.23E-03 -	**0.00E+00**
	T5	5.02E+01 -	2.48E+01 -	4.90E+00 -	1.20E+01 -	4.00E+00 -	1.62E+01 -	**3.38E+00**†	4.59E+00 -	3.92E+00
	T6	5.77E+03 †	1.30E+04 -	9.54E+03 -	1.39E+04 -	1.25E+04 -	**5.68E+03**†	1.20E+04 -	8.39E+03 -	6.11E+03
	T7	3.66E+04 -	3.88E+02 -	1.02E+02 -	4.93E+02 -	6.42E+03 -	2.58E+02 -	5.68E+01 -	**4.50E+01**†	4.55E+01
P10	T1	2.00E+01 -	2.84E+00 -	1.44E-02 -	3.68E-01 -	4.56E-08 -	5.84E-01 -	1.42E-01 -	2.88E-10 -	**2.31E-14**
	T2	4.70E+02 -	3.63E+02 -	3.54E+02 -	4.05E+02 -	1.84E+02 -	1.89E+02 -	3.04E+02 -	1.73E+02 -	**1.52E+02**
	T3	1.64E-01 -	1.01E-02 -	2.94E-03 -	1.77E-02 -	2.09E-04 -	3.91E-02 -	1.76E-07 -	1.73E-03 -	**0.00E+00**
	T4	5.13E+01 -	2.60E+01 -	4.89E+00 -	3.27E+00 †	3.58E+00 †	1.81E+01 -	**3.06E+00**†	3.62E+00 †	3.74E+00
	T5	6.66E+03 -	1.33E+04 -	1.00E+04 -	5.12E+03 †	1.26E+04 -	**5.54E+03**†	1.26E+04 -	8.80E+03 -	6.61E+03
	T6	2.00E+01 -	2.93E+00 -	1.43E-02 -	3.26E-03 -	2.12E-02 -	8.10E-01 -	2.01E-01 -	2.22E-10 -	**2.45E-14**
	T7	4.58E+02 -	3.78E+02 -	3.43E+02 -	**1.35E+02**†	1.98E+02 -	2.02E+02 -	3.18E+02 -	1.71E+02 -	1.52E+02
† /≈/ -		4/0/66	1/0/69	1/0/69	12/0/58	8/0/62	5/0/65	3/0/67	6/0/64	Base

Table 8 Average ranking of the algorithms om WCCI2020-MTSO and WCCI20-MaTSO benchmarks. (Friedman)

Problems	WCCI20-MTSO			Problems	WCCI20-MaTSO P1 - P5		WCCI20-MaTSO P6 - P10	
Algorithm	Ave rank	Std rank	Over rank	Algorithm	Std rank	Over rank	Ave rank	Over rank
MFEA	5.575	6.4	8	MFEA	8.7143	9	8.2571	9
TLTLA	5.15	5.7	5	MaTDE	5.5857	6	7.1429	8
SREMTO	6.475	6	9	MTEA-AD	6.3	7	5.3143	6
MTEA-SaO	4.8	5.5	4	KR-MTEA	4.7714	4	5.2857	5
MTEA-AD	5.25	5.75	6	BoKTDE	4.8429	5	3.9857	3
MFEA-AKT	4.8	4.85	3	SBGA	6.5714	8	5.9429	7
BLKT-DE	5.65	6.2	7	TRADE	3.9	3	4.3571	4
MFMP	3.6	2.65	2	MFMP	2.5	2	3.0571	2
MPEF-MRL	3.7	1.95	1	MPEF-MRL	1.8143	1	1.6571	1