APPENDIX

As shown in Table I, II and III, the experimental results of benchmark functions can be shown in details. Opt, Worst and Median are the optimum value, worst value and median of the 30-time operations, respectively. Guangzhou Baiyun International Airport 2015, 26 July, the data include 30 gates and 250 aircraft can be seen in Table IV and Table V.

TABLE I

The numerical simulation results (D=30)

Function	Algorithm	Opt	Worst	Mean	Std	Median
f_1	Bina-DE	2.31E-001	3.06E+000	1.32E+000	7.54E-001	1.23E+000
	M-SSA [38]	**0.00E+000**	1.06E-041	3.57E-043	1.90E-042	3.69E-142
	NEBDE	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	PSDE	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	NS-MJPSO [37]	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	ACDE/F [4]	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	NSVMDE	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
f_2	Bina-DE	1.41E+000	6.01E+000	3.42E+000	1.17E+000	3.14E+000
	M-SSA [38]	**0.00E+000**	1.73E-019	5.82E-021	3.10E-020	1.41E-071
	NEBDE	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	PSDE	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	NS-MJPSO [37]	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	ACDE/F [4]	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	NSVMDE	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
f_3	Bina-DE	1.74E+000	1.08E+001	4.52E+000	2.10E+000	4.25E+000
	M-SSA [38]	0.00E+000	2.40E-038	1.31E-039	5.02E-039	1.40E-161
	NEBDE	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	PSDE	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	NS-MJPSO [37]	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	ACDE/F [4]	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	NSVMDE	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
f_4	Bina-DE	4.99E-001	6.78E-001	5.35E-001	5.12E-002	5.18E-001
	M-SSA [38]	**0.00E+000**	2.38E-027	8.02E-029	4.27E-028	7.32E-105
	NEBDE	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	PSDE	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	NS-MJPSO [37]	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	ACDE/F [4]	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	NSVMDE	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	Bina-DE	3.95E+001	3.18E+002	1.98E+002	6.24E+001	2.03E+002
	M-SSA [38]	6.09E-012	2.61E-002	1.04E-002	6.79E-003	9.65E-003
	NEBDE	2.82E+001	2.89E+001	2.87E+001	1.72E-001	2.88E+001
	PSDE	2.83E+001	2.89E+001	2.87E+001	1.42E-001	2.88E+001

f_5	NS-MJPSO [37]	1.64E-007	8.75E-003	7.95E-004	1.85E-003	1.69E-004
	ACDE/F [4]	2.72E−010	4.53E+000	8.69E−001	4.76E+000	1.12E−006
	NSVMDE	**0.00E+000**	**9.43E-014**	**3.14E-015**	**0.00E+000**	**0.00E+000**
f_6	Bina-DE	9.45E-001	4.96E+000	2.48E+000	1.20E+000	2.13E+000
	M-SSA [38]	6.14E-011	4.66E-004	8.01E-005	8.64E-005	6.17E-005
	NEBDE	4.92E+000	6.08E+000	5.56E+000	3.02E-001	5.50E+000
	PSDE	4.58E+000	6.30E+000	5.60E+000	4.20E-001	5.56E+000
	NS-MJPSO [37]	6.53E-010	1.04E-005	1.27E-006	2.09E-006	5.75E-007
	ACDE/F [4]	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	NSVMDE	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
f_7	Bina-DE	4.06E-001	1.37E+001	5.30E+000	3.81E+000	4.42E+000
	M-SSA [38]	**0.00E+000**	1.92E-084	6.40E-086	3.45E-085	0.00E+000
	NEBDE	**0.00E+000**	0.00E+000	0.00E+000	0.00E+000	0.00E+000
	PSDE	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	NS-MJPSO [37]	3.21E-047	3.11E-012	1.09E-013	5.57E-013	4.56E-022
	ACDE/F [4]	8.82E−007	7.66E−006	3.33E−006	2.71E−006	3.36E−006
	NSVMDE	4.66E-011	9.33E-008	2.76E-008	2.59E-008	2.39E-008
f_8	Bina-DE	-2.52E+001	0.00E+000	-2.10E+001	5.13E+000	-2.19E+001
	M-SSA [38]	-1.18E+002	-1.18E+002	-1.18E+002	1.26E-004	-1.18E+002
	NEBDE	-2.45E+002	-3.29E+001	-1.22E+002	**5.72E+001**	-1.13E+002
	PSDE	-4.07E+002	-3.89E+001	-1.23E+002	7.98E+001	-1.06E+002
	NS-MJPSO [37]	-1.91E+003	-1.63E+003	-1.88E+003	8.31E+001	-1.91E+003
	ACDE/F [4]	**−1.23E+004**	**−1.02E+004**	**−1.12E+004**	6.40E+002	**−1.14E+004**
	NSVMDE	-7.45E+002	-1.18E+002	-4.20E+002	3.02E+002	-4.18E+002
f_9	Bina-DE	1.00E+000	6.98E+000	3.04E+000	1.60E+000	2.99E+000
	M-SSA [38]	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	NEBDE	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	PSDE	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	NS-MJPSO [37]	**0.00E+000**	8.34E-005	6.87E-006	1.85E-005	**0.00E+000**
	ACDE/F [4]	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	NSVMDE	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
f_{10}	Bina-DE	1.02E+001	1.14E+001	1.05E+001	3.42E-001	1.03E+001
	M-SSA [38]	1.02E+001	1.02E+001	1.02E+001	1.51E-005	1.02E+001
	NEBDE	1.50E+001	1.65E+001	1.58E+001	3.59E-001	1.58E+001
	PSDE	1.57E+001	1.82E+001	1.71E+001	6.87E-001	1.73E+001
	NS-MJPSO [37]	1.02E+001	1.02E+001	1.02E+001	1.85E-005	1.02E+001
	ACDE/F [4]	**4.44E−016**	**4.44E−016**	**4.44E−016**	**0.00E+000**	**4.44E−016**
	NSVMDE	1.02E+001	1.05E+001	1.02E+001	8.62E-002	1.02E+001
	Bina-DE	1.00E+000	1.00E+000	1.00E+000	1.46E-004	1.00E+000
	M-SSA [38]	0.00E+000	1.46E-034	4.93E-036	2.63E-035	8.27E-103
	NEBDE	1.00E+000	1.00E+000	1.00E+000	**0.00E+000**	1.00E+000
	PSDE	1.00E+000	1.00E+000	1.00E+000	**0.00E+000**	1.00E+000
	NS-MJPSO [37]	1.00E+000	1.00E+000	1.00E+000	1.00E+000	1.00E+000

f_{11}	ACDE/F [4]	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	NSVMDE	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
f_{12}	Bina-DE	1.33E+005	3.00E+006	1.30E+006	7.19E+005	1.17E+006
	M-SSA [38]	**0.00E+000**	1.17E-037	3.91E-039	2.11E-038	4.82E-173
	NEBDE	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	PSDE	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	NS-MJPSO [37]	1.26E-019	9.52E+001	3.74E+000	1.73E+001	1.27E-008
	ACDE/F [4]	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	NSVMDE	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
f_{13}	Bina-DE	2.18E-006	4.00E+000	1.53E+000	8.48E-001	1.47E+000
	M-SSA [38]	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	NEBDE	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	PSDE	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	NS-MJPSO [37]	**0.00E+000**	7.42E-007	4.42E-008	1.54E-007	8.60E-013
	ACDE/F [4]	**0.00E+000**	1.70E+001	2.40E+000	3.76E+000	1.00E+000
	NSVMDE	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
f_{14}	Bina-DE	2.64E+004	5.23E+005	2.39E+005	1.32E+005	1.99E+005
	M-SSA [38]	1.16E+001	1.16E+001	1.16E+001	**1.70E-006**	1.16E+001
	NEBDE	**1.15E+001**	**1.16E+001**	**1.15E+001**	3.49E-002	**1.15E+001**
	PSDE	**1.15E+001**	**1.16E+001**	**1.15E+001**	2.77E-002	**1.15E+001**
	NS-MJPSO [37]	1.16E+001	1.16E+001	1.16E+001	2.85E-003	1.16E+001
	ACDE/F [4]	1.16E+001	1.16E+001	1.16E+001	7.45E−003	1.16E+001
	NSVMDE	**1.15E+001**	**1.16E+001**	**1.15E+001**	3.32E-002	**1.15E+001**

TABLE II

The numerical simulation results (D=50)

Function	Algorithm	Opt	Worst	Mean	Std	Median
f_1	Bina-DE	3.03E-001	1.33E+000	5.93E-001	2.20E-001	5.56E-001
	M-SSA [38]	**0.00E+000**	8.33E-012	2.97E-013	1.50E-012	1.92E-038
	NEBDE	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	PSDE	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	NS-MJPSO [37]	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	ACDE/F [4]	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	NSVMDE	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
f_2	Bina-DE	2.84E-001	4.40E+000	2.14E+000	9.23E-001	2.08E+000
	M-SSA [38]	**0.00E+000**	8.10E-019	2.70E-020	1.45E-019	5.39E-071
	NEBDE	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	PSDE	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	NS-MJPSO [37]	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	ACDE/F [4]	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	NSVMDE	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**

f_3	Bina-DE	1.73E+000	1.03E+001	4.59E+000	1.66E+000	4.59E+000
	M-SSA [38]	**0.00E+000**	2.14E-035	7.14E-037	3.84E-036	6.56E-182
	NEBDE	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	PSDE	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	NS-MJPSO [37]	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	ACDE/F [4]	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	NSVMDE	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
f_4	Bina-DE	4.28E-001	6.51E-001	5.09E-001	4.59E-002	5.04E-001
	M-SSA [38]	**0.00E+000**	2.33E-022	7.75E-024	4.17E-023	1.04E-063
	NEBDE	**0.00E+000**	3.20E-058	1.13E-059	5.85E-059	2.08E-183
	PSDE	8.84E-046	1.88E-010	1.00E-011	3.90E-011	1.92E-020
	NS-MJPSO [37]	5.15E-012	2.70E-004	1.76E-005	5.11E-005	6.25E-007
	ACDE/F [4]	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	NSVMDE	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
f_5	Bina-DE	5.07E+001	2.07E+002	1.09E+002	4.99E+001	9.97E+001
	M-SSA [38]	8.83E-007	1.70E-001	3.96E-002	3.62E-002	2.98E-002
	NEBDE	4.74E+001	4.88E+001	4.85E+001	4.15E-001	4.87E+001
	PSDE	4.84E+001	4.89E+001	4.88E+001	1.19E-001	4.89E+001
	NS-MJPSO [37]	**4.92E-009**	**3.66E-003**	**3.84E-004**	**8.62E-004**	**4.04E-005**
	ACDE/F [4]	1.53E+001	4.77E+001	2.70E+001	1.29E+001	2.12E+001
	NSVMDE	3.76E-004	4.19E-001	9.69E-002	9.64E-002	6.23E-002
f_6	Bina-DE	3.94E-003	3.39E-002	1.52E-002	7.81E-003	1.25E-002
	M-SSA [38]	1.10E-005	9.45E-004	3.03E-004	2.09E-004	2.42E-004
	NEBDE	7.54E+000	9.84E+000	8.88E+000	5.24E-001	8.89E+000
	PSDE	9.60E+000	1.11E+001	1.03E+001	4.00E-001	1.02E+001
	NS-MJPSO [37]	7.62E-011	1.75E-005	1.59E-006	3.97E-006	8.16E-008
	ACDE/F [4]	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	NSVMDE	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
f_7	Bina-DE	1.26E-003	1.12E-001	2.13E-002	2.34E-002	1.49E-002
	M-SSA [38]	**0.00E+000**	2.64E-080	8.79E-082	4.81E-081	0.00E+000
	NEBDE	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	PSDE	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	NS-MJPSO [37]	4.08E-039	1.22E-011	4.66E-013	2.23E-012	2.22E-026
	ACDE/F [4]	6.45E−007	7.86E−006	3.41E−006	4.49E−006	2.89E−006
	NSVMDE	6.66E-011	1.02E-006	2.68E-007	2.71E-007	1.99E-007
f_8	Bina-DE	-4.21E+001	0.00E+000	-3.27E+001	9.77E+000	-3.41E+001
	M-SSA [38]	-1.97E+002	-1.97E+002	-1.97E+002	7.18E-004	-1.97E+002
	NEBDE	-1.50E+002	-1.23E+002	-1.34E+002	7.00E+000	-1.32E+002
	PSDE	-2.92E+002	-4.00E+001	-1.18E+002	6.99E+001	-9.75E+001
	NS-MJPSO [37]	-3.18E+003	-2.72E+003	-3.12E+003	1.60E+002	-3.18E+003
	ACDE/F [4]	**−1.88E+004**	**−1.52E+004**	**−1.70E+004**	**1.29E+003**	**−1.68E+004**
	NSVMDE	-7.22E+002	-1.18E+002	-3.39E+002	2.89E+002	-1.18E+002

f_9	Bina-DE	1.99E+000	8.95E+000	4.51E+000	2.17E+000	3.98E+000
	M-SSA [38]	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	NEBDE	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	PSDE	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	NS-MJPSO [37]	**0.00E+000**	8.74E-004	3.51E-005	1.60E-004	2.38E-008
	ACDE/F [4]	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	NSVMDE	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
f_{10}	Bina-DE	1.02E+001	1.08E+001	1.04E+001	2.03E-001	1.03E+001
	M-SSA [38]	1.02E+001	1.02E+001	1.02E+001	7.72E-006	1.02E+001
	NEBDE	1.31E+001	1.47E+001	1.40E+001	3.57E-001	1.40E+001
	PSDE	1.58E+001	1.84E+001	1.74E+001	6.63E-001	1.75E+001
	NS-MJPSO [37]	1.02E+001	1.02E+001	1.02E+001	6.72E-006	1.02E+001
	ACDE/F [4]	**4.44E−016**	**4.44E−016**	**4.44E−016**	**0.00E+000**	**4.44E−016**
	NSVMDE	1.02E+001	1.06E+001	1.02E+001	1.27E-001	1.02E+001
f_{11}	Bina-DE	1.00E+000	1.00E+000	1.00E+000	1.07E-006	1.00E+000
	M-SSA [38]	**0.00E+000**	8.90E-038	2.97E-039	1.63E-038	2.06E-119
	NEBDE	1.00E+000	1.00E+000	1.00E+000	0.00E+000	1.00E+000
	PSDE	1.00E+000	1.00E+000	1.00E+000	0.00E+000	1.00E+000
	NS-MJPSO [37]	1.00E+000	1.00E+000	1.00E+000	2.53E-009	1.00E+000
	ACDE/F [4]	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	NSVMDE	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
f_{12}	Bina-DE	1.36E+003	1.98E+004	6.69E+003	4.25E+003	5.88E+003
	M-SSA [38]	**0.00E+000**	2.37E-038	7.99E-040	4.33E-039	7.11E-136
	NEBDE	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	PSDE	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	NS-MJPSO [37]	7.27E-012	1.55E+001	1.24E+000	3.78E+000	2.45E-004
	ACDE/F [4]	4.49E−021	1.26E−014	6.36E−016	2.75E−015	3.30E−019
	NSVMDE	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
f_{13}	Bina-DE	2.73E-003	1.06E+000	1.60E-001	3.48E-001	2.12E-002
	M-SSA [38]	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	NEBDE	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	PSDE	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	NS-MJPSO [37]	**0.00E+000**	2.30E-004	1.13E-005	4.56E-005	5.23E-012
	ACDE/F [4]	1.00E+000	3.00E+001	1.04E+001	6.64E+000	1.00E+001
	NSVMDE	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
f_{14}	Bina-DE	2.49E+002	3.58E+003	1.58E+003	1.01E+003	1.46E+003
	M-SSA [38]	1.96E+001	1.96E+001	1.96E+001	**4.22E-007**	1.96E+001
	NEBDE	1.95E+001	1.96E+001	1.95E+001	3.50E-002	1.95E+001
	PSDE	1.95E+001	1.96E+001	1.96E+001	3.64E-002	1.95E+001
	NS-MJPSO [37]	1.96E+001	2.20E+001	1.97E+001	4.45E-001	1.96E+001
	ACDE/F [4]	1.95E+001	1.96E+001	1.95E+001	6.50E−003	1.95E+001
	NSVMDE	**1.94E+001**	**1.96E+001**	**1.95E+001**	4.70E-002	**1.95E+001**

TABLE III

The numerical simulation results (D=100)

Function	Algorithm	Opt	Worst	Mean	Std	Median
f_1	Bina-DE	2.55E-001	8.65E-001	4.48E-001	1.61E-001	3.85E-001
	M-SSA [38]	2.61E-106	2.29E-005	9.24E-007	4.09E-006	3.56E-008
	NEBDE	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	PSDE	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	NS-MJPSO [37]	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	ACDE/F [4]	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	NSVMDE	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
f_2	Bina-DE	6.01E+000	1.93E+001	1.19E+001	3.34E+000	1.16E+001
	M-SSA [38]	**0.00E+000**	8.82E-015	2.94E-016	1.58E-015	1.28E-080
	NEBDE	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	PSDE	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	NS-MJPSO [37]	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	ACDE/F [4]	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	NSVMDE	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
f_3	Bina-DE	7.71E+000	3.49E+001	1.81E+001	6.37E+000	1.67E+001
	M-SSA [38]	**0.00E+000**	3.45E-029	1.15E-030	6.20E-030	1.27E-160
	NEBDE	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	PSDE	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	NS-MJPSO [37]	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	ACDE/F [4]	**0.00E+000**	1.28E+006	8.34E+004	2.95E+005	**0.00E+000**
	NSVMDE	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
f_4	Bina-DE	4.83E-001	7.11E-001	5.44E-001	6.12E-002	5.11E-001
	M-SSA [38]	**0.00E+000**	1.01E-020	3.38E-022	1.82E-021	1.39E-090
	NEBDE	9.19E-002	1.00E+000	9.40E-001	2.30E-001	1.00E+000
	PSDE	1.00E+000	1.00E+000	1.00E+000	0.00E+000	1.00E+000
	NS-MJPSO [37]	6.36E-08	3.35E-04	6.02E-05	9.80E-05	1.03E-05
	ACDE/F [4]	**0.00E+000**	4.00E+000	1.30E+000	1.17E+000	1.00E+000
	NSVMDE	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
f_5	Bina-DE	1.67E+002	5.42E+002	3.08E+002	8.52E+001	3.09E+002
	M-SSA [38]	**1.95E-010**	3.33E-001	1.27E-001	1.12E-001	1.23E-001
	NEBDE	4.76E+001	4.88E+001	4.84E+001	3.95E-001	4.85E+001
	PSDE	9.80E+001	1.55E+007	1.74E+006	3.71E+006	9.96E+001
	NS-MJPSO [37]	1.67E-007	**3.03E-002**	**1.47E-003**	**5.60E-003**	**2.78E-005**
	ACDE/F [4]	7.89E+001	9.81E+001	8.50E+001	4.85E+000	8.38E+001
	NSVMDE	2.10E+000	1.39E+002	5.45E+001	3.87E+001	3.47E+001
	Bina-DE	3.16E-001	1.17E+000	5.98E-001	2.10E-001	5.55E-001
	M-SSA [38]	4.24E-008	2.84E-003	1.14E-003	6.93E-004	1.06E-003
	NEBDE	1.95E+001	2.12E+001	2.04E+001	4.06E-001	2.05E+001
	PSDE	5.64E+002	2.28E+003	1.12E+003	4.06E+002	1.10E+003

f_6	NS-MJPSO [37]	7.79E-012	9.11E-006	1.05E-006	2.11E-006	9.81E-008
	ACDE/F [4]	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	NSVMDE	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
f_7	Bina-DE	9.72E-001	7.46E+000	3.62E+000	1.53E+000	3.62E+000
	M-SSA [38]	**0.00E+000**	1.34E-076	4.45E-078	2.44E-077	0.00E+000
	NEBDE	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	PSDE	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	NS-MJPSO [37]	1.49E-042	5.08E-007	1.69E-008	9.27E-008	6.06E-016
	ACDE/F [4]	6.45E-007	7.86E-006	3.41E-006	4.49E-006	2.89E-006
	NSVMDE	8.80E-011	1.21E-006	1.62E-007	2.58E-007	5.68E-008
f_8	Bina-DE	-8.41E+001	0.00E+000	-6.57E+001	1.60E+001	-6.77E+001
	M-SSA [38]	-3.95E+002	-3.95E+002	-3.95E+002	3.68E-003	-3.95E+002
	NEBDE	-2.35E+002	-1.88E+002	-2.09E+002	1.31E+001	-2.08E+002
	PSDE	-6.44E+002	-1.18E+002	-3.66E+002	1.21E+002	-3.79E+002
	NS-MJPSO [37]	-6.36E+003	-5.44E+003	-6.21E+003	3.50E+002	-6.36E+003
	ACDE/F [4]	**−3.17E+004**	**−1.01E+004**	**−2.58E+004**	**4.69E+003**	**−2.70E+004**
	NSVMDE	-1.28E+003	-1.97E+002	-6.01E+002	4.94E+002	-1.97E+002
f_9	Bina-DE	4.99E+000	1.99E+001	1.30E+001	3.51E+000	1.39E+001
	M-SSA [38]	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	NEBDE	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	PSDE	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	NS-MJPSO [37]	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	ACDE/F [4]	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	NSVMDE	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
f_{10}	Bina-DE	1.02E+001	1.11E+001	1.04E+001	2.42E-001	1.03E+001
	M-SSA [38]	1.02E+001	1.02E+001	1.02E+001	3.31E-004	1.02E+001
	NEBDE	1.33E+001	1.63E+001	1.45E+001	6.17E-001	1.45E+001
	PSDE	1.64E+001	1.90E+001	1.77E+001	6.00E-001	1.76E+001
	NS-MJPSO [37]	1.02E+001	1.02E+001	1.02E+001	6.21E-006	1.02E+001
	ACDE/F [4]	**4.44E−016**	**4.44E−016**	**4.44E−016**	**0.00E+000**	**4.44E−016**
	NSVMDE	1.02E+001	1.06E+001	1.02E+001	9.16E-002	1.02E+001
f_{11}	Bina-DE	1.00E+000	1.00E+000	1.00E+000	4.25E-005	1.00E+000
	M-SSA [38]	**0.00E+000**	2.43E-049	8.11E-051	4.44E-050	1.66E-223
	NEBDE	1.00E+000	1.00E+000	1.00E+000	**0.00E+000**	1.00E+000
	PSDE	1.00E+000	1.00E+000	1.00E+000	**0.00E+000**	1.00E+000
	NS-MJPSO [37]	1.00E+000	1.00E+000	1.00E+000	2.70E-009	1.00E+000
	ACDE/F [4]	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	NSVMDE	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	Bina-DE	2.47E+005	8.99E+005	4.39E+005	1.54E+005	4.21E+005

f_{12}	M-SSA [38]	**0.00E+000**	5.35E-039	1.94E-040	9.77E-040	1.32E-105
	NEBDE	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	PSDE	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	NS-MJPSO [37]	7.27E-009	2.09E+002	1.24E+001	4.01E+001	3.24E-003
	ACDE/F [4]	1.51E−001	1.55E+004	8.36E+002	3.38E+003	3.23E+000
	NSVMDE	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
f_{13}	Bina-DE	2.05E-001	2.27E+000	9.41E-001	5.30E-001	8.54E-001
	M-SSA [38]	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	NEBDE	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	PSDE	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
	NS-MJPSO [37]	**0.00E+000**	3.99E-004	2.24E-005	7.84E-005	2.07E-009
	ACDE/F [4]	2.20E+001	6.00E+001	3.62E+001	8.27E+000	3.35E+001
	NSVMDE	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**	**0.00E+000**
f_{14}	Bina-DE	4.51E+004	1.53E+005	8.84E+004	2.43E+004	8.45E+004
	M-SSA [38]	3.96E+001	3.96E+001	3.96E+001	**1.61E-007**	3.96E+001
	NEBDE	3.95E+001	3.96E+001	3.96E+001	3.72E-002	3.95E+001
	PSDE	3.95E+001	2.01E+008	1.60E+007	4.55E+007	1.00E+006
	NS-MJPSO [37]	3.96E+001	6.01E+001	4.05E+001	3.77E+000	3.96E+001
	ACDE/F [4]	3.95E+001	3.95E+001	3.95E+001	1.05E−002	3.95E+001
	NSVMDE	**3.95E+001**	**3.96E+001**	**3.95E+001**	3.76E-002	**3.95E+001**

TABLE IV

Gate information

Gate	Passenger walking distance	Gate type	Gate	Passenger walking distance	Gate type
1	190	M	16	115	L
2	975	M	17	215	M
3	400	L	18	535	S
4	333	M	19	1050	M
5	260	L	20	170	M
6	135	S	21	585	L
7	1100	M	22	1250	M
8	150	M	23	500	L
9	384	L	24	920	L
10	960	M	25	270	L
11	1000	S	26	230	M
12	235	L	27	265	L
13	1200	S	28	450	L
14	580	L	29	1300	M
15	440	L	30	426	L

TABLE V

Aircraft information

Aircraft	Arrival time	Departure time	Passenger walking steps	Aircraft type
1	2015-7-26 0:05:00	2015-7-26 7:15:00	482	L
2	2015-7-26 0:05:00	2015-7-26 7:45:00	273	M
3	2015-7-26 0:10:00	2015-7-26 7:30:00	261	M
4	2015-7-26 0:15:00	2015-7-26 7:30:00	116	M
5	2015-7-26 0:15:00	2015-7-26 9:15:00	244	M
6	2015-7-26 0:20:00	2015-7-26 10:30:00	312	L
7	2015-7-26 0:25:00	2015-7-26 1:20:00	340	L
8	2015-7-26 0:30:00	2015-7-26 10:00:00	198	M
9	2015-7-26 0:35:00	2015-7-26 8:10:00	184	M
10	2015-7-26 0:35:00	2015-7-26 10:55:00	494	
⋮	⋮	⋮	⋮	⋮
				L
249	2015-7-26 23:50:00	2015-07-27 01:50:00	128	M
250	2015-7-26 23:55:00	2015-7-27 9:10:00	307	L