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Two-level Particle Swarm Optimization for the Multi-Modal Team Orienteering Problem with Time Windows

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Graphical abstract⁷

First-level solution representation ($l = 1$) with a total dimension (D_1) of 21

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(0)
0.25	0.5	0.62	0.7	0.1	0.45	0.85	0.2	0.6	0.21	0.38	0.55	0.71	0.3	0.88	0.12	0.9	0.75	0.4	0.8	0.52

Second-level solution representation ($l = 2$) with a total dimension (D_2) of 22

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
0.3	0.63	0.5	0.32	0.5	0.26	0.5	0.94	0.47	0.14	0.83	0.30	0.53	0.44	0.86	0.90	0.34	0.57	0.76	0.51	0.12	0.80

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