

Experiments Results

For Particle Swarm Optimization

Function: **Spherical**, $f(0, 0) = 0$

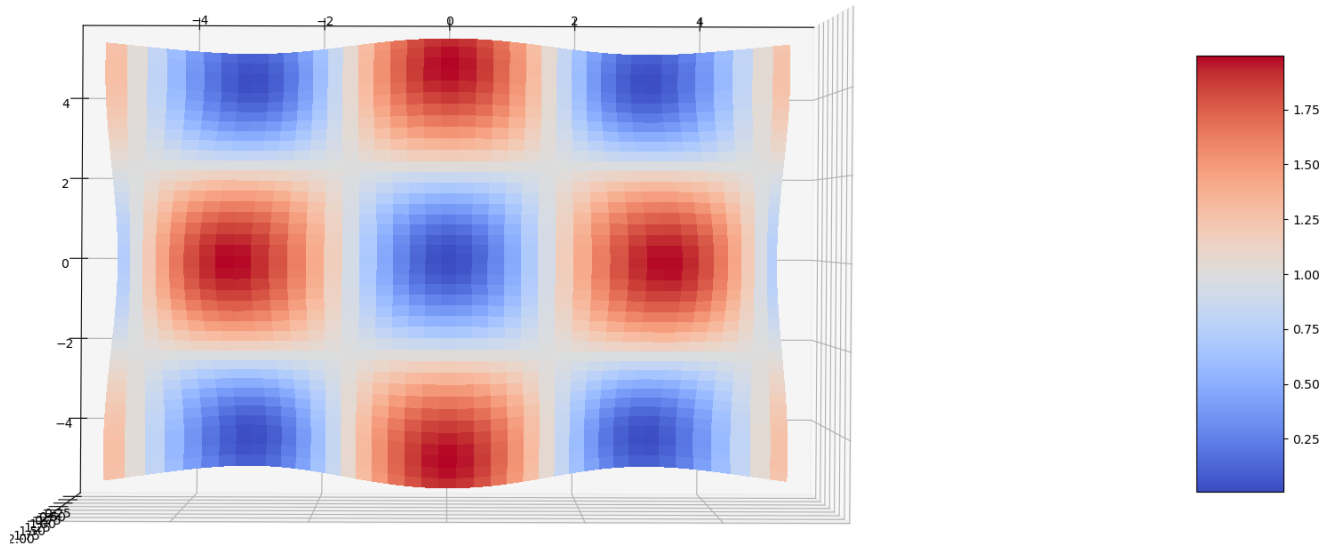
PSO Variant	Topology	Param Pair	Point of optimum	Value
Vanilla	Star	1, 0.5	['0.0018438415', '-0.0075885779']	0.0000609863
Vanilla	Star	0.5, 1	['-0.0035508545', '0.0034669475']	0.0000246283
Vanilla	Star	2.05, 2.05	['-0.0103039090', '-0.0116961969']	0.0002429716
Vanilla	Ring	1, 0.5	['2.7649674467', '-2.6356318616']	0.0000627415
Vanilla	Ring	0.5, 1	['-5.0966001580', '-3.3075659744']	0.0006082512
Vanilla	Ring	2.05, 2.05	['-0.0188941993', '0.0073986964']	0.0000547669
Vanilla	Four N	1, 0.5	['-0.0220193050', '-0.0079308969']	0.0000014341
Vanilla	Four N	0.5, 1	['-0.8127763839', '0.0028278338']	0.0000055765
Vanilla	Four N	2.05, 2.05	['-0.0014415588', '-0.0020520563']	0.0000003321
Inertia Weight	Star	1, 0.5	['0.0000000000', '-0.0000000000']	0.0000000000
Inertia Weight	Star	0.5, 1	['-0.0000000000', '-0.0000000000']	0.0000000000
Inertia Weight	Star	2.05, 2.05	['-0.0000000000', '-0.0000000000']	0.0000000000
Inertia Weight	Ring	1, 0.5	['-0.0000000000', '0.0000000000']	0.0000000000
Inertia Weight	Ring	0.5, 1	['-0.0000000000', '0.0000000000']	0.0000000000
Inertia Weight	Ring	2.05, 2.05	['-0.0000000000', '-0.0000000001']	0.0000000000
Inertia Weight	Four N	1, 0.5	['0.0000457415', '0.0035249347']	0.0000124273
Inertia Weight	Four N	0.5, 1	['-0.0155172385', '0.0401915215']	0.0018561431
Inertia Weight	Four N	2.05, 2.05	['-0.0019287333', '-0.0000013100']	0.0000037200
Constriction Factor	Star	1, 0.5	['-0.0000000000', '-0.0000000000']	0.0000000000
Constriction Factor	Star	0.5, 1	['-0.0000000000', '0.0000000000']	0.0000000000
Constriction Factor	Star	2.05, 2.05	['0.0000000000', '0.0000000000']	0.0000000000
Constriction Factor	Ring	1, 0.5	['-0.0000000000', '0.0000000000']	0.0000000000
Constriction Factor	Ring	0.5, 1	['0.0000000000', '-0.0000000000']	0.0000000000
Constriction Factor	Ring	2.05, 2.05	['0.0000000000', '-0.0000000000']	0.0000000000
Constriction Factor	Four N	1, 0.5	['0.0006647017', '-0.0059813473']	0.0000362183
Constriction Factor	Four N	0.5, 1	['-0.0611105886', '0.1079911615']	0.0153965950
Constriction Factor	Four N	2.05, 2.05	['0.0010215005', '0.0000000003']	0.0000010435

Function: **Rastrigin, $f(0, 0) = 0$**

PSO Variant	Topology	Param Pair	Point of optimum	Value
Vanilla	Star	1, 0.5	['0.0027356533', '-0.0049833220']	0.0064110592
Vanilla	Star	0.5, 1	['0.0032951942', '-0.0113594537']	0.0277432714
Vanilla	Star	2.05, 2.05	['0.0063329089', '-0.0013811960']	0.0083340867
Vanilla	Ring	1, 0.5	['-1.2441172320', '1.2343064888']	0.0012202069
Vanilla	Ring	0.5, 1	['4.9932959199', '-0.9161213742']	0.0120227719
Vanilla	Ring	2.05, 2.05	['3.4614176497', '-3.6029262706']	0.0032332575
Vanilla	Four N	1, 0.5	['-2.2418534068', '0.0100741121']	0.0184761354
Vanilla	Four N	0.5, 1	['-0.0004724137', '0.7932623615']	0.0008093669
Vanilla	Four N	2.05, 2.05	['-2.9255228036', '2.7794410356']	0.0218384840
Inertia Weight	Star	1, 0.5	['0.0000000002', '-0.0000000014']	0.0000000000
Inertia Weight	Star	0.5, 1	['0.0000000013', '0.0000000007']	0.0000000000
Inertia Weight	Star	2.05, 2.05	['-0.0000000016', '0.0000000014']	0.0000000000
Inertia Weight	Ring	1, 0.5	['-0.0000000011', '0.0000000016']	0.0000000000
Inertia Weight	Ring	0.5, 1	['-0.0000000045', '0.0000000005']	0.0000000000
Inertia Weight	Ring	2.05, 2.05	['-0.0000000025', '0.00000008639']	0.0000000000
Inertia Weight	Four N	1, 0.5	['-0.9821272969', '0.0015285671']	1.0280249842
Inertia Weight	Four N	0.5, 1	['0.0008255637', '-0.0000509149']	0.0001357292
Inertia Weight	Four N	2.05, 2.05	['0.0010755314', '-0.0000000083']	0.0002294927
Constriction Factor	Star	1, 0.5	['-0.0000000014', '0.0000000006']	0.0000000000
Constriction Factor	Star	0.5, 1	['0.0000000005', '-0.0000000000']	0.0000000000
Constriction Factor	Star	2.05, 2.05	['0.0000000005', '-0.0000000006']	0.0000000000
Constriction Factor	Ring	1, 0.5	['-0.0000000019', '0.0000000007']	0.0000000000
Constriction Factor	Ring	0.5, 1	['-0.0000000001', '0.0000000157']	0.0000000000
Constriction Factor	Ring	2.05, 2.05	['-0.0000000048', '0.0000000010']	0.0000000000
Constriction Factor	Four N	1, 0.5	['-0.0000126022', '0.0001929106']	0.0000074146
Constriction Factor	Four N	0.5, 1	['-0.0040457432', '0.0014950981']	0.0036905815
Constriction Factor	Four N	2.05, 2.05	['0.0340062909', '-0.0011244891']	0.2288098601

Function: **Griewank**, $f(0, 0) = 0$

PSO Variant	Topology	Param Pair	Point of optimum	Value
Vanilla	Star	1, 0.5	['-0.0038263095', '0.0029776787']	0.0000095428
Vanilla	Star	0.5, 1	['0.0024125767', '-0.0199165962']	0.0001021767
Vanilla	Star	2.05, 2.05	['0.0028899888', '-0.0197720622']	0.0001020074
Vanilla	Ring	1, 0.5	['-0.4849809929', '2.8876100808']	0.0000150474
Vanilla	Ring	0.5, 1	['5.1200000000', '4.9940896237']	0.0001040904
Vanilla	Ring	2.05, 2.05	['0.4276161820', '-5.1200000000']	0.0000569752
Vanilla	Four N	1, 0.5	['-0.6905906315', '0.0004524408']	0.0000030468
Vanilla	Four N	0.5, 1	['-0.6780857496', '0.1140060833']	0.0000015617
Vanilla	Four N	2.05, 2.05	['-0.0552087336', '-0.0269627753']	0.0000110439
Inertia Weight	Star	1, 0.5	['0.0000000103', '-0.0000000126']	0.0000000000
Inertia Weight	Star	0.5, 1	['-0.0000000093', '-0.0000000018']	0.0000000000
Inertia Weight	Star	2.05, 2.05	['0.0000000083', '-0.0000000112']	0.0000000000
Inertia Weight	Ring	1, 0.5	['0.0000000043', '0.0000000054']	0.0000000000
Inertia Weight	Ring	0.5, 1	['0.0000000055', '0.0000000058']	0.0000000000
Inertia Weight	Ring	2.05, 2.05	['0.0000030475', '0.0000001632']	0.0000000000
Inertia Weight	Four N	1, 0.5	['0.0043957228', '-0.0325605242']	0.0002749637
Inertia Weight	Four N	0.5, 1	['-0.0031589012', '-0.0287954890']	0.0002124860
Inertia Weight	Four N	2.05, 2.05	['-0.0014981519', '-0.0000000402']	0.0000011228
Constriction Factor	Star	1, 0.5	['-0.0000000022', '-0.0000000092']	0.0000000000
Constriction Factor	Star	0.5, 1	['-0.0000000085', '-0.0000000082']	0.0000000000
Constriction Factor	Star	2.05, 2.05	['-0.0000000059', '0.0000000145']	0.0000000000
Constriction Factor	Ring	1, 0.5	['0.0000000011', '0.0000000190']	0.0000000000
Constriction Factor	Ring	0.5, 1	['-0.0000000077', '-0.0000000038']	0.0000000000
Constriction Factor	Ring	2.05, 2.05	['0.0000000010', '-0.0000000311']	0.0000000000
Constriction Factor	Four N	1, 0.5	['-0.0120857980', '0.0395415538']	0.0004642894
Constriction Factor	Four N	0.5, 1	['-0.0002784008', '0.0161002048']	0.0000649070
Constriction Factor	Four N	2.05, 2.05	['0.0008361626', '0.0004086316']	0.0000003915



Function: **Rosenbrock, $f(1, 1) = 0$**

PSO Variant	Topology	Param Pair	Point of optimum	Value
Vanilla	Star	1, 0.5	['0.9949126684', '0.9888107792']	0.0001341322
Vanilla	Star	0.5, 1	['0.9627659355', '0.9298958104']	0.0022729642
Vanilla	Star	2.05, 2.05	['1.0137416461', '1.0315727783']	0.0017103425
Vanilla	Ring	1, 0.5	['1.8883784617', '3.2578906128']	0.0000099057
Vanilla	Ring	0.5, 1	['5.1200000000', '-0.2982977997']	0.0054705450
Vanilla	Ring	2.05, 2.05	['-2.8096706988', '-3.1623900684']	0.0015545873
Vanilla	Four N	1, 0.5	['1.3521139776', '1.0150995024']	0.0002841895
Vanilla	Four N	0.5, 1	['1.0013764059', '0.4551095122']	0.0002069466
Vanilla	Four N	2.05, 2.05	['2.4118379118', '0.6996069442']	0.0005326470
Inertia Weight	Star	1, 0.5	['1.0000000000', '1.0000000000']	0.0000000000
Inertia Weight	Star	0.5, 1	['1.0000000000', '1.0000000000']	0.0000000000
Inertia Weight	Star	2.05, 2.05	['1.0000009671', '1.0000019035']	0.0000000000
Inertia Weight	Ring	1, 0.5	['1.0000000805', '1.0000001597']	0.0000000000
Inertia Weight	Ring	0.5, 1	['0.9999981718', '0.9999966084']	0.0000000000
Inertia Weight	Ring	2.05, 2.05	['0.9716041116', '0.7535776012']	0.0001072682
Inertia Weight	Four N	1, 0.5	['1.0189657164', '1.0383860442']	0.0003605992
Inertia Weight	Four N	0.5, 1	['0.9862101678', '0.9726026419']	0.0001901656
Inertia Weight	Four N	2.05, 2.05	['1.1442461209', '1.3092608874']	0.0208070901
Constriction Factor	Star	1, 0.5	['1.0000000000', '1.0000000000']	0.0000000000
Constriction Factor	Star	0.5, 1	['1.0000000000', '1.0000000000']	0.0000000000
Constriction Factor	Star	2.05, 2.05	['1.0000000000', '1.0000000000']	0.0000000000
Constriction Factor	Ring	1, 0.5	['0.9999998166', '0.9999991013']	0.0000000000
Constriction Factor	Ring	0.5, 1	['0.9999999906', '0.999999705']	0.0000000000
Constriction Factor	Ring	2.05, 2.05	['0.9821753950', '0.9829056423']	0.0000009757
Constriction Factor	Four N	1, 0.5	['0.9812695417', '0.9627945264']	0.0003517399
Constriction Factor	Four N	0.5, 1	['1.0004792388', '1.0009610920']	0.0000002302
Constriction Factor	Four N	2.05, 2.05	['0.9871693063', '0.9744382520']	0.0001650490