A Short List of Benchmark Problems for Continuous Optimization

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The complete list of benchmark problems is as shown at Table 1.

Table 1: List of Benchmark Problems for Continuous Optimization. Dim. represents the feasible dimension of the problem. When multiple dimension applys, the letter M is used. In the column *Traits*, four letters are used to indicate various traits of the problem. The traits are: (C)ontinuous / (D)iscontinuous; (R)egular / (I)rregular ; (S)eparable / (N)on-separable ; (U)ni-modal / (M)ulti-modal .

Problem Name	Dim.	Traits	Problem Name	Dim.	Traits
Ackley N.1	M	CRNM	Ackley N.2	M	CRNU
Ackley N.3	2	CRNM	Ackley N.4	2	CRNM
Adjiman	2	CRNM	Alpine01	M	CISM
Alpine02	M	CRSM	Arithmetic Mean - Geometric Mean Equality	M	CRNU
Bartels Conn	2	CINM	Beale	2	CRNU
Biggs EXP2	2	CRNM	Biggs EXP3	3	CRNM
Biggs EXP4	4	CRNM	Biggs EXP5	5	CRNM
Biggs EXP6	6	CRNM	Bird	2	CRNM
Bohachevsky 1	M	CRSM	Bohachevsky 2	M	CRNM
Bohachevsky 3	M	CRNM	Booth	2	CRNU
Box-Betts	3	CRNM	Branin N.1	2	CRNM
Branin N.2	2	CRNM	Brent	M	CRNU
Brown	M	CRNU	Broyden Tridiagonal	2	CINU
Bukin N.2	2	CRNM	Bukin N.4	2	CISM
Bukin N.6	2	CINM	Camel-Back - Six Hump	2	CRNM
Camel-Back - Three Hump	2	CRNM	Carrom Table	2	CRNM
Chen Bird	2	CRNM	Chen V	2	CRNM
Chichinadze	2	CRSM	Chung Reynolds	M	CRNU
Cigar	M	CRSU	Colville	4	CRNM
Corana	4	DISM	Cosine Mixture	M	DISM
Cross In Cray	2	CINM	Cross Leg Table	M	CINM
Crowned Cross	2	CINM	Csendes	M	CRSM
Cube	2	CRNU	Damavandi	2	CRNM
De Jong 5	2	CRSM	Deb N.1	M	CRSM
Deb N.3	M	CRSM	Deceptive Type 1	M	DISU
Deceptive Type 2	M	DISU	Deceptive Type 3	M	DISU
Deckkers-Aarts	2	CRNM	Deflected Corrugated Spring	M	CRNU
Dennis Woods	2	CINU	Dennis Woods Modified	2	CINU

Table 1: (Continued)

Problem Name	Dim.	Traits	Problem Name	Dim.	Traits
DeVilliers Glasser N.1	4	CRNM	DeVilliers Glasser N.2	5	CRNM
Dixon-Price	M	CRNU	Dolan	5	CRNM
Drop Wave Extended	2	CRNM	Easom	M	CRSM
Egg Crate Extended	M	CRSM	Egg Holder	2	CRNM
El-Attar-Vidyasagar-Dutta	2	CRNU	Elliptic	M	CRSU
Elliptic	M	CRSU	Exponential	M	CRNM
Exponential 2	2	CRNU	Fletcher-Powell	2	CINM
Freudenstein Roth	2	CRNM	Gear	4	CINM
Giunta	2	CRSM	Goldstein-Price	2	CRNM
Gramacy & Lee	1	CRNM	Griewank	M	CRNM
Gulf	3	CRNM	Gyro	M	CRNM
Hansen	2	CRSM	Hartman 3	3	CRNM
Hartman 6	6	CRNM	Helical Valley	3	CRNM
Himmelblau	2	CRNM	Himmelblau Modified	2	CRNM
Holder-Table	2	CINM	Holzman	3	CRNM
Hosaki	2	CRNM	Inversed Standard Deviation	M	DINM
Jennrich Sampson	2	CRNM	Judge	2	CRNU
Katsuura	M	CINU	Keane	2	CRNM
Kowalik	4	CRNM	Langerman-5	M	CRNM
Lennard Jones	M	CRNM	Leon	2	CRNU
Levy 3	2	CRNM	Levy 5	2	CRNM
Levy 13	2	CRNM	Matyas	2	CRNU
McCormick	2	CRNM	Michalewicz	M	CRNM
Miele Cantrell	4	CRNM	Mishra 1	M	CRNM
Mishra 2	M	CRNM	Mishra 3	2	CRNM
Mishra 4	2	CRNM	Mishra 5	2	CRNM
Mishra 6	2	CRNM	Mishra 7	M	CRNM
Mishra 8	2	CRNM	Mishra 9	3	CRNM
Mishra 10	M	CRNM	Mishra 11	M	CRNM
Multi Modal	M	CINM	Needle Eye	M	CINU
NewFunction01	2	CINM	NewFunction02	2	CINM
NewFunction03	2	CRNM	Non-Continuous Rastrigin	M	DINM
OddSquare	M	DINM	Parsopoulos	2	CRSM
Pathological	M	CRNM	Paviani	10	CRNM

Table 1: (Continued)

Problem Name	Dim.	Traits	Problem Name	Dim.	Traits
Pen Holder	2	CRNM	Penalized Fucntion 16	M	CINM
Penalized Fucntion 8	M	CINM	Periodic Extended	M	CRSM
Perm	4	CRNM	Perm0	4	CRNM
Pinter	M	CRNM	Powell Singular 1	M	CRNU
Powell Singular 2	M	CRNU	Power Sum	4	CRSU
Price 1	M	CISM	Price 2	M	CRNM
Price 3	2	CRNM	Price 4	2	CRNM
Qing	M	CRSM	Quadratic	2	CRNU
Quartic	M	CRSU	Quintic	M	CRSM
Rana	2	CRNM	Rastrigin	M	CRSM
Ripple 1	2	CRNM	Ripple 25	2	CRNM
Rosenbrock	M	CRNU	Rosenbrock Modified	2	CRNM
Rotated Ellipse 1	2	CRNU	Rotated Ellipse 2	2	CRNU
Rotated Hyper-Ellipsoid	M	CRNU	Rump	2	CRNU
Salomon	M	CRNM	Sargan	M	CRNM
Schaffer	M	CRNU	Schaffer F1	M	CRNU
Schaffer F2	2	CRNU	Schaffer F3	2	CRNU
Schaffer F4	2	CRNU	Schaffer F6	M	CRNM
Schmidt Vetters	3	CRNM	Schwefel 1.2	M	CRNU
Schwefel 2.4	M	CRSM	Schwefel 2.6	2	CRNU
Schwefel 2.20	M	CISU	Schwefel 2.21	M	CISU
Schwefel 2.22	M	CRNU	Schwefel 2.23	M	CRNU
Schwefel 2.25	2	CRSM	Schwefel 2.26	M	CRSM
Schwefel 2.36	2	CRSM	Shekel 5	4	CRNM
Shekel 7	4	CRNM	Shekel 10	4	CRNM
Shubert	2	CRSM	Shubert 3	2	CRSM
Shubert 4	2	CRSM	Sine Envelope	M	CINM
Sphere	M	CRSU	Step 2	M	DISU
Step 3	M	DISU	Stepint	M	DISU
Stochastic	M	DISM	Streched V Sine Wave	M	CRNU
Styblinski-Tang	M	CRNM	Sum of Different Power	M	CISU
Test Tube Holder	2	CRSM	Treccani	2	CRSU
Trefethen	2	CRNM	Trid	M	CRNM
Trigonometric 1	M	CRNM	Trigonometric 2	M	CRNM
Tripod	2	DINM	Ursem 1	2	CRSM
Ursem 3	2	CRNM	Ursem 4	2	CRNM

Table 1: (Continued)

Problem Name	Dim.	Traits	Problem Name	Dim.	Traits
Ursem Waves	2	CRNM	Venter Sobiezcczanski-Sobieski	2	CRSM
Vincent	M	CRSM	Watson	6	CRNM
Wavy	M	CRSM	Wayburn Seader 1	2	CRNU
Wayburn Seader 2	2	CRNU	Wayburn Seader 3	2	CRNU
Weierstrass	M	CRSM	Weight Sphere	M	CRSU
Whitley	M	CRNM	Wolfe	3	CRSM
Xin-She Yang N.1	M	DRSM	Xin-She Yang N.2	M	DINM
Xin-She Yang N.3	M	DINM	Xin-She Yang N.4	M	DINM
Xor	9	CINM	Zakharov	10	CRNM
Zero-Sum	2	DINM	Zettle	2	CRNU
Zimmerman	2	DINM	Zirilli	2	CRSU
Zirilli2	2	CRSM			