|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Function | Expression | Range | Dimension | Optimal X | Optimal F |
| Ackley1 |  |  |  |  |  |
| Alpine1 |  |  |  |  |  |
| Bartels Conn |  |  |  |  |  |
| **Beale** |  |  |  |  |  |
| **Bird** |  |  |  |  |  |
| Bohachevsky1 |  |  |  |  |  |
| Bohachevsky2 |  |  |  |  |  |
| Bohachevsky3 |  |  |  |  |  |
| Booth |  |  |  |  |  |
| **Branin** |  |  |  |  |  |
| **Brown** |  |  |  |  |  |
| Chung Reynolds |  |  |  |  |  |
| Cigar |  |  |  |  |  |
| **Colville** |  |  |  |  |  |
| Cosine Mixture |  |  |  |  |  |
| Csendes |  |  |  |  |  |
| **De Jong5**  **(Shekel's Foxholes, Fifth)** |  |  |  |  |  |
| Drop wave |  |  |  |  |  |
| Easom |  |  |  |  |  |
| Ellipsoid |  |  |  |  |  |
| Ellipsoidal |  |  |  |  |  |
| Elliptic |  |  |  |  |  |
| Exponential |  |  |  |  |  |
| Fletcher |  |  |  |  |  |
| Gold Stein & Price |  |  |  |  |  |
| Griewank |  |  |  |  |  |
| Hartmann3 |  |  |  |  |  |
| Hartmann6 |  |  |  |  |  |
| Inverted Cosine Mixture |  |  |  |  |  |
| **Kowalik** |  |  |  |  |  |
| k-tablet |  |  |  |  |  |
| Leon |  |  |  |  |  |
| Levy |  |  |  |  |  |
| **Levy and Montalvo1** |  |  |  |  |  |
| **Levy and Montalvo2** |  |  |  |  |  |
| Matyas |  |  |  |  |  |
| **Michalewicz** |  |  |  |  |  |
| Noncontinuous Rastrigin |  |  |  |  |  |
| Pathological |  |  |  |  |  |
| Paviani |  |  |  |  |  |
| Penalized 1 |  |  |  |  |  |
| **Penalized 2** |  |  |  |  |  |
| Powell |  |  |  |  |  |
| Powell sum |  |  |  |  |  |
| Quartic Noise |  |  |  |  |  |
| Quartic |  |  |  |  |  |
| Rastrigin |  |  |  |  |  |
| Rosenbrock |  |  |  |  |  |
| Salomon |  |  |  |  |  |
| Schaffer |  |  |  |  |  |
| Schaffer F6 |  |  |  |  |  |
| Schwefel P1.2 |  |  |  |  |  |
| **Schwefel P2.21** |  |  |  |  |  |
| Schwefel P2.22 |  |  |  |  |  |
| Schwefel P2.26 |  |  |  |  |  |
| **Shekel 5** |  |  |  |  |  |
| **Shekel 7** |  |  |  |  |  |
| **Shekel 10** |  |  |  |  |  |
| Shubert |  |  |  |  |  |
| Sinusoidal |  |  |  |  |  |
| Six Hump Camel Back |  |  |  |  |  |
| Sphere |  |  |  |  |  |
| Step |  |  |  |  |  |
| Sum of different power |  |  |  |  |  |
| Sum Power |  |  |  |  |  |
| Sum Squares  (Axis parallel hyper-ellipsoid) |  |  |  |  |  |
| Tablet |  |  |  |  |  |
| Xin She Yang3 |  |  |  |  |  |
| Xin She Yang4 |  |  |  |  |  |
| Zakharov |  |  |  |  |  |
| Zettl |  |  |  |  |  |