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AlgoGA Class

Encapsulation of the GA Algorithm

**Optimização.AlgoGA**

|  |  |
| --- | --- |
| C# |  |
| public class AlgoGA | |

Requirements

**Namespace:**[Optimização](#topic_0000000000000000)

**Platforms:** Windows 8, Windows Server 2012, Windows 7, Windows Vista SP1 or later, Windows XP SP3, Windows XP SP2 x64 Edition, Windows Server 2008 (Server Core not supported), Windows Server 2008 R2 (Server Core supported with SP1 or later), Windows Server 2003 SP2

**Assembly:** Optimização (in Optimização.exe)

Constructors

[AlgoGA Constructor](#topic_0000000000000002)

Methods

[Equals](http://msdn.microsoft.com/en-us/library/system.object.equals.aspx) (inherited from [Object](http://msdn.microsoft.com/en-us/library/system.object.aspx)), [GetHashCode](http://msdn.microsoft.com/en-us/library/system.object.gethashcode.aspx) (inherited from [Object](http://msdn.microsoft.com/en-us/library/system.object.aspx)), [GetType](http://msdn.microsoft.com/en-us/library/system.object.gettype.aspx) (inherited from [Object](http://msdn.microsoft.com/en-us/library/system.object.aspx)), [ReferenceEquals](http://msdn.microsoft.com/en-us/library/system.object.referenceequals.aspx) (inherited from [Object](http://msdn.microsoft.com/en-us/library/system.object.aspx)), [ToString](http://msdn.microsoft.com/en-us/library/system.object.tostring.aspx) (inherited from [Object](http://msdn.microsoft.com/en-us/library/system.object.aspx)), [copyLine](#topic_0000000000000003), [crossover](#topic_0000000000000007), [initializePopulation](#topic_000000000000000A), [loadParameters](#topic_0000000000000004), [mutation](#topic_0000000000000008), [rating](#topic_0000000000000005), [run](#topic_0000000000000009), [selection](#topic_0000000000000006)

AlgoGA Constructor

Constructor, init the dimension

|  |  |
| --- | --- |
| C# |  |
| public AlgoGA(  [int](http://msdn.microsoft.com/en-us/library/system.int32.aspx) *pDimension* ) | |

Parameters

pDimension

|  |
| --- |
| Dimension of the fitnes function ; This represents n |

Source code

|  |
| --- |
| public AlgoGA(int pDimension)  {  this.dimension = pDimension;  } |

Requirements

**Platforms:** Windows 8, Windows Server 2012, Windows 7, Windows Vista SP1 or later, Windows XP SP3, Windows XP SP2 x64 Edition, Windows Server 2008 (Server Core not supported), Windows Server 2008 R2 (Server Core supported with SP1 or later), Windows Server 2003 SP2

See Also

Applies to: [AlgoGA](#topic_0000000000000001)

AlgoGA.copyLine Method

Copy a line of the file and split by word

|  |  |
| --- | --- |
| C# |  |
| private [double](http://msdn.microsoft.com/en-us/library/system.double.aspx)[] copyLine(  [string](http://msdn.microsoft.com/en-us/library/system.string.aspx)[] *words* ) | |

Parameters

words

|  |
| --- |
| Line of the text file |

Returns

Table with words splitted

Source code

|  |
| --- |
| private double[] copyLine(string[] words)  {  double[] ret;    ret = new double[words.Length - 1];  for (int i = 0; i < words.Length - 1; ++i)  {  ret[i] = Convert.ToDouble(words[i + 1]);  }    return ret;  } |

Requirements

**Platforms:** Windows 8, Windows Server 2012, Windows 7, Windows Vista SP1 or later, Windows XP SP3, Windows XP SP2 x64 Edition, Windows Server 2008 (Server Core not supported), Windows Server 2008 R2 (Server Core supported with SP1 or later), Windows Server 2003 SP2

See Also

Applies to: [AlgoGA](#topic_0000000000000001)

AlgoGA.crossover Method

|  |  |
| --- | --- |
| C# |  |
| public [void](http://msdn.microsoft.com/en-us/library/system.void.aspx) crossover(  [int](http://msdn.microsoft.com/en-us/library/system.int32.aspx) *pCrossoverMethod* ) | |

Parameters

pCrossoverMethod

|  |
| --- |
|  |

Source code

|  |
| --- |
| public void crossover(int pCrossoverMethod)  {  #region Crossover Method 1  if (pCrossoverMethod == 1)  {    return;  }  #endregion    #region Crossover Method 2  if (pCrossoverMethod == 2)  {    return;  }  #endregion  } |

Requirements

**Platforms:** Windows 8, Windows Server 2012, Windows 7, Windows Vista SP1 or later, Windows XP SP3, Windows XP SP2 x64 Edition, Windows Server 2008 (Server Core not supported), Windows Server 2008 R2 (Server Core supported with SP1 or later), Windows Server 2003 SP2

See Also

Applies to: [AlgoGA](#topic_0000000000000001)

AlgoGA.initializePopulation Method

Init The population in radnom with the function's limits

|  |  |
| --- | --- |
| C# |  |
| private [void](http://msdn.microsoft.com/en-us/library/system.void.aspx) initializePopulation(  [double](http://msdn.microsoft.com/en-us/library/system.double.aspx) *minX1*,  [double](http://msdn.microsoft.com/en-us/library/system.double.aspx) *maxX1* ) | |

Parameters

minX1

|  |
| --- |
|  |

maxX1

|  |
| --- |
|  |

Source code

|  |
| --- |
| private void initializePopulation(double minX1, double maxX1)  {  for (int i = 0; i < this.popSize[0] ; ++i)  {  population[i] = random.NextDouble() \* (maxX1 - minX1) + minX1;  }  } |

Requirements

**Platforms:** Windows 8, Windows Server 2012, Windows 7, Windows Vista SP1 or later, Windows XP SP3, Windows XP SP2 x64 Edition, Windows Server 2008 (Server Core not supported), Windows Server 2008 R2 (Server Core supported with SP1 or later), Windows Server 2003 SP2

See Also

Applies to: [AlgoGA](#topic_0000000000000001)

AlgoGA.loadParameters Method

Loading all parameters from file PM, PC, POP\_SIZE, GEN\_NB, FUNC\_NAME

|  |  |
| --- | --- |
| C# |  |
| public [void](http://msdn.microsoft.com/en-us/library/system.void.aspx) loadParameters() | |

Source code

|  |
| --- |
| public void loadParameters()  {  string[] lines = System.IO.File.ReadAllLines(this.parameterFile);  string function = "";  foreach (string line in lines)  {  string[] words = line.Split('\t');    if (words[0] == "PM") this.pm = copyLine(words);  if (words[0] == "PC") this.pc = copyLine(words);  if (words[0] == "POP\_SIZE") this.popSize = copyLine(words);  if (words[0] == "GEN\_NB") this.nbGen = copyLine(words);  if (words[0] == "FUNC\_NAME") function = words[1];  }    this.functionToCall = (Functions.functionName)Enum.Parse(typeof(Functions.functionName), function, true);    foreach (double p in pm) { Console.WriteLine("pm = " + p); }  foreach (double p in pc) { Console.WriteLine("pc = " + p); }  foreach (double p in nbGen) { Console.WriteLine("nbG = " + p); }  foreach (double p in popSize) { Console.WriteLine("popSize = " + p); }    Console.WriteLine("Function's Name : {0}", this.functionToCall.ToString());  } |

Requirements

**Platforms:** Windows 8, Windows Server 2012, Windows 7, Windows Vista SP1 or later, Windows XP SP3, Windows XP SP2 x64 Edition, Windows Server 2008 (Server Core not supported), Windows Server 2008 R2 (Server Core supported with SP1 or later), Windows Server 2003 SP2

See Also

Applies to: [AlgoGA](#topic_0000000000000001)

AlgoGA.mutation Method

|  |  |
| --- | --- |
| C# |  |
| public [void](http://msdn.microsoft.com/en-us/library/system.void.aspx) mutation() | |

Source code

|  |
| --- |
| public void mutation()   {     } |

Requirements

**Platforms:** Windows 8, Windows Server 2012, Windows 7, Windows Vista SP1 or later, Windows XP SP3, Windows XP SP2 x64 Edition, Windows Server 2008 (Server Core not supported), Windows Server 2008 R2 (Server Core supported with SP1 or later), Windows Server 2003 SP2

See Also

Applies to: [AlgoGA](#topic_0000000000000001)

AlgoGA.rating Method

|  |  |
| --- | --- |
| C# |  |
| public [void](http://msdn.microsoft.com/en-us/library/system.void.aspx) rating() | |

Source code

|  |
| --- |
| public void rating()  {    } |

Requirements

**Platforms:** Windows 8, Windows Server 2012, Windows 7, Windows Vista SP1 or later, Windows XP SP3, Windows XP SP2 x64 Edition, Windows Server 2008 (Server Core not supported), Windows Server 2008 R2 (Server Core supported with SP1 or later), Windows Server 2003 SP2

See Also

Applies to: [AlgoGA](#topic_0000000000000001)

AlgoGA.run Method

Main function with the loop

|  |  |
| --- | --- |
| C# |  |
| public [void](http://msdn.microsoft.com/en-us/library/system.void.aspx) run() | |

Source code

|  |
| --- |
| public void run()  {  this.loadParameters();    population = new double[(int)popSize[0]];  initializePopulation(Functions.limits[(int)this.functionToCall][0], Functions.limits[(int)this.functionToCall][1]);  for (int i = 0; i < population.Length; ++i)  Console.WriteLine("population n" + i + " = " + population[i]);  } |

Requirements

**Platforms:** Windows 8, Windows Server 2012, Windows 7, Windows Vista SP1 or later, Windows XP SP3, Windows XP SP2 x64 Edition, Windows Server 2008 (Server Core not supported), Windows Server 2008 R2 (Server Core supported with SP1 or later), Windows Server 2003 SP2

See Also

Applies to: [AlgoGA](#topic_0000000000000001)

AlgoGA.selection Method

|  |  |
| --- | --- |
| C# |  |
| public [void](http://msdn.microsoft.com/en-us/library/system.void.aspx) selection(  [int](http://msdn.microsoft.com/en-us/library/system.int32.aspx) *pSelectionMethod* ) | |

Parameters

pSelectionMethod

|  |
| --- |
|  |

Source code

|  |
| --- |
| public void selection(int pSelectionMethod)  {  #region Selection Method 1  if (pSelectionMethod == 1)  {    return;  }  #endregion    #region Selection Method 2  if (pSelectionMethod == 2)  {    return;  }  #endregion  } |

Requirements

**Platforms:** Windows 8, Windows Server 2012, Windows 7, Windows Vista SP1 or later, Windows XP SP3, Windows XP SP2 x64 Edition, Windows Server 2008 (Server Core not supported), Windows Server 2008 R2 (Server Core supported with SP1 or later), Windows Server 2003 SP2

See Also

Applies to: [AlgoGA](#topic_0000000000000001)

AlgoPSO Class

Encapsulation of the PSO Algorithm

**Optimização.AlgoPSO**

|  |  |
| --- | --- |
| C# |  |
| public class AlgoPSO | |

Requirements

**Namespace:**[Optimização](#topic_0000000000000000)

**Platforms:** Windows 8, Windows Server 2012, Windows 7, Windows Vista SP1 or later, Windows XP SP3, Windows XP SP2 x64 Edition, Windows Server 2008 (Server Core not supported), Windows Server 2008 R2 (Server Core supported with SP1 or later), Windows Server 2003 SP2

**Assembly:** Optimização (in Optimização.exe)

Constructors

[AlgoPSO Constructor](#topic_000000000000000C)

Methods

[Equals](http://msdn.microsoft.com/en-us/library/system.object.equals.aspx) (inherited from [Object](http://msdn.microsoft.com/en-us/library/system.object.aspx)), [GetHashCode](http://msdn.microsoft.com/en-us/library/system.object.gethashcode.aspx) (inherited from [Object](http://msdn.microsoft.com/en-us/library/system.object.aspx)), [GetType](http://msdn.microsoft.com/en-us/library/system.object.gettype.aspx) (inherited from [Object](http://msdn.microsoft.com/en-us/library/system.object.aspx)), [ReferenceEquals](http://msdn.microsoft.com/en-us/library/system.object.referenceequals.aspx) (inherited from [Object](http://msdn.microsoft.com/en-us/library/system.object.aspx)), [ToString](http://msdn.microsoft.com/en-us/library/system.object.tostring.aspx) (inherited from [Object](http://msdn.microsoft.com/en-us/library/system.object.aspx)), [callFitnessFunction](#topic_000000000000000F), [findGbest](#topic_000000000000000E), [initializePopulation](#topic_0000000000000011), [initializeSpeed](#topic_0000000000000010), [run](#topic_000000000000000D)

AlgoPSO Constructor

|  |  |
| --- | --- |
| C# |  |
| public AlgoPSO(  [int](http://msdn.microsoft.com/en-us/library/system.int32.aspx) *pPopulation\_size*,  [int](http://msdn.microsoft.com/en-us/library/system.int32.aspx) *pMax\_iter*,  [functionName](#) *pFitness\_function*,  [int](http://msdn.microsoft.com/en-us/library/system.int32.aspx) *pDimension* ) | |

Parameters

pPopulation\_size

|  |
| --- |
|  |

pMax\_iter

|  |
| --- |
|  |

pFitness\_function

|  |
| --- |
|  |

pDimension

|  |
| --- |
|  |

Source code

|  |
| --- |
| public AlgoPSO(int pPopulation\_size, int pMax\_iter, Functions.functionName pFitness\_function, int pDimension)  {  // Define constants  this.population\_size = pPopulation\_size;  this.max\_iter = pMax\_iter;  this.fitness\_function = pFitness\_function;  this.dimension = pDimension;    // Define the datas  speeds = new double[this.population\_size][];  for (int i = 0; i < speeds.Length; ++i) { speeds[i] = new double[this.dimension]; }    population = new double[this.population\_size][];  for (int i = 0; i < population.Length; ++i) { population[i] = new double[this.dimension]; }    pbests = new double[this.population\_size][];  for (int i = 0; i < pbests.Length; ++i) { pbests[i] = new double[this.dimension + 1]; }    gbest = new double[this.dimension + 1];    #region Write some info outputs  Console.WriteLine("---------------------------------------------------");  Console.WriteLine("--------------------- New PSO ---------------------");  Console.WriteLine("---------------------------------------------------\n");  Console.WriteLine("[parameters]");  Console.WriteLine("Population Size : " + this.population\_size);  Console.WriteLine("Maximum of Iteration : " + this.max\_iter);  Console.WriteLine("Dimension : " + this.dimension);  Console.WriteLine("\nWmin : " + this.w\_min);  Console.WriteLine("Wmax : " + this.w\_max);  Console.WriteLine("C1 : " + this.c1);  Console.WriteLine("C2 : " + this.c2);    Console.WriteLine("\nCall of the \"" + this.fitness\_function.ToString() + "\" function");  #endregion  } |

Requirements

**Platforms:** Windows 8, Windows Server 2012, Windows 7, Windows Vista SP1 or later, Windows XP SP3, Windows XP SP2 x64 Edition, Windows Server 2008 (Server Core not supported), Windows Server 2008 R2 (Server Core supported with SP1 or later), Windows Server 2003 SP2

See Also

Applies to: [AlgoPSO](#topic_000000000000000B)

AlgoPSO.callFitnessFunction Method

|  |  |
| --- | --- |
| C# |  |
| private [double](http://msdn.microsoft.com/en-us/library/system.double.aspx) callFitnessFunction(  [double](http://msdn.microsoft.com/en-us/library/system.double.aspx) *x*,  [double](http://msdn.microsoft.com/en-us/library/system.double.aspx) *y* ) | |

Parameters

x

|  |
| --- |
|  |

y

|  |
| --- |
|  |

Source code

|  |
| --- |
| private double callFitnessFunction(double x, double y)  {  return Functions.callFunction(this.fitness\_function, new double[2] { x, y });  //return Math.Pow(x - 2, 2) + Math.Pow(y - 5, 2);  } |

Requirements

**Platforms:** Windows 8, Windows Server 2012, Windows 7, Windows Vista SP1 or later, Windows XP SP3, Windows XP SP2 x64 Edition, Windows Server 2008 (Server Core not supported), Windows Server 2008 R2 (Server Core supported with SP1 or later), Windows Server 2003 SP2

See Also

Applies to: [AlgoPSO](#topic_000000000000000B)

AlgoPSO.findGbest Method

|  |  |
| --- | --- |
| C# |  |
| private [double](http://msdn.microsoft.com/en-us/library/system.double.aspx)[] findGbest(  [double](http://msdn.microsoft.com/en-us/library/system.double.aspx)[][] *pbests*,  [bool](http://msdn.microsoft.com/en-us/library/system.boolean.aspx) *firstTime* ) | |

Parameters

pbests

|  |
| --- |
|  |

firstTime

|  |
| --- |
|  |

Source code

|  |
| --- |
| private double[] findGbest(double[][] pbests, bool firstTime)  {  if (firstTime)  {  for (int ite = 0; ite < this.dimension + 1 ; ++ite)  gbest[ite] = pbests[0][ite];  }    foreach (Double[] bird in pbests)  {  if (bird[this.dimension] < gbest[this.dimension])  {  for (int ite = 0; ite < this.dimension + 1; ++ite)  gbest[ite] = bird[ite];  }  }  return gbest;  } |

Requirements

**Platforms:** Windows 8, Windows Server 2012, Windows 7, Windows Vista SP1 or later, Windows XP SP3, Windows XP SP2 x64 Edition, Windows Server 2008 (Server Core not supported), Windows Server 2008 R2 (Server Core supported with SP1 or later), Windows Server 2003 SP2

See Also

Applies to: [AlgoPSO](#topic_000000000000000B)

AlgoPSO.initializePopulation Method

|  |  |
| --- | --- |
| C# |  |
| private [void](http://msdn.microsoft.com/en-us/library/system.void.aspx) initializePopulation(  [double](http://msdn.microsoft.com/en-us/library/system.double.aspx) *minX1*,  [double](http://msdn.microsoft.com/en-us/library/system.double.aspx) *maxX1* ) | |

Parameters

minX1

|  |
| --- |
|  |

maxX1

|  |
| --- |
|  |

Source code

|  |
| --- |
| private void initializePopulation(double minX1, double maxX1)  {  for (int i = 0; i < this.population\_size; ++i)  {  for (int ite = 0; ite < this.dimension; ++ite)  population[i][ite] = random.NextDouble() \* (maxX1 - minX1) + minX1;  if (population\_size <= 25)  Console.WriteLine("population[" + i + "] = (" + population[i][0] + ", " + population[i][1] + ")");  }  } |

Requirements

**Platforms:** Windows 8, Windows Server 2012, Windows 7, Windows Vista SP1 or later, Windows XP SP3, Windows XP SP2 x64 Edition, Windows Server 2008 (Server Core not supported), Windows Server 2008 R2 (Server Core supported with SP1 or later), Windows Server 2003 SP2

See Also

Applies to: [AlgoPSO](#topic_000000000000000B)

AlgoPSO.initializeSpeed Method

|  |  |
| --- | --- |
| C# |  |
| private [void](http://msdn.microsoft.com/en-us/library/system.void.aspx) initializeSpeed(  [double](http://msdn.microsoft.com/en-us/library/system.double.aspx) *minX1*,  [double](http://msdn.microsoft.com/en-us/library/system.double.aspx) *maxX1* ) | |

Parameters

minX1

|  |
| --- |
|  |

maxX1

|  |
| --- |
|  |

Source code

|  |
| --- |
| private void initializeSpeed(double minX1, double maxX1)  {  for (int i = 0; i < this.population\_size; ++i)  {  for (int ite = 0; ite < this.dimension; ++ite)  speeds[i][ite] = random.Next(0, 10);  if (population\_size <= 25)  Console.WriteLine("speeds[" + i + "] = (" + speeds[i][0] + ", " + speeds[i][1] + ")");  }  } |

Requirements

**Platforms:** Windows 8, Windows Server 2012, Windows 7, Windows Vista SP1 or later, Windows XP SP3, Windows XP SP2 x64 Edition, Windows Server 2008 (Server Core not supported), Windows Server 2008 R2 (Server Core supported with SP1 or later), Windows Server 2003 SP2

See Also

Applies to: [AlgoPSO](#topic_000000000000000B)

AlgoPSO.run Method

|  |  |
| --- | --- |
| C# |  |
| public [double](http://msdn.microsoft.com/en-us/library/system.double.aspx)[] run(  [double](http://msdn.microsoft.com/en-us/library/system.double.aspx)[] *constraints* ) | |

Parameters

constraints

|  |
| --- |
|  |

Source code

|  |
| --- |
| public double[] run(double[] constraints)  {  double ret;  bool firstTime = true;    #region Initialization + Write Infos  Console.WriteLine("\n[Constraints]");  Console.WriteLine(constraints[0] + "<= Xi <=" + constraints[1]);    Console.WriteLine("\n---------- Initialization of Population ----------");  this.initializePopulation(constraints[0], constraints[1]);    Console.WriteLine("\n---------- Initialization of Speeds ----------");  this.initializeSpeed(constraints[0], constraints[1]);  #endregion    #region Main Loop  for (int k = 0; k < this.max\_iter; ++k)  {  w = this.w\_max - ((this.w\_max - this.w\_min) \* (k + 1)) / this.max\_iter;    // Evaluation of fitness and save the pbest  for (int i = 0; i < this.population\_size; ++i)  {  ret = callFitnessFunction(population[i][0], population[i][1]);  if (ret < pbests[i][this.dimension] || firstTime)  {  // Save of coordinates and value at the end  for (int ite = 0; ite < this.dimension; ++ite )  pbests[i][ite] = population[i][ite];  pbests[i][this.dimension] = ret;  }  }    // Find the gbest (which is the best pbest)  findGbest(pbests, firstTime);  firstTime = false;    // Update Data : Speed and population positions  for (int i = 0; i < this.population\_size; ++i)  {  for (int ite = 0; ite < this.dimension ; ++ite)  {  speeds[i][ite] = w \* (speeds[i][ite] + this.c1 \* random.NextDouble() \* (pbests[i][ite] - population[i][ite])  + this.c2 \* random.NextDouble() \* (gbest[ite] - population[i][ite]));  population[i][ite] += speeds[i][ite];  }  }  }  #endregion    return this.gbest;  } |

Requirements

**Platforms:** Windows 8, Windows Server 2012, Windows 7, Windows Vista SP1 or later, Windows XP SP3, Windows XP SP2 x64 Edition, Windows Server 2008 (Server Core not supported), Windows Server 2008 R2 (Server Core supported with SP1 or later), Windows Server 2003 SP2

See Also

Applies to: [AlgoPSO](#topic_000000000000000B)

Functions Class

Encapsulation of fitness functions to test

**Optimização.Functions**

|  |  |
| --- | --- |
| C# |  |
| public class Functions | |

Requirements

**Namespace:**[Optimização](#topic_0000000000000000)

**Platforms:** Windows 8, Windows Server 2012, Windows 7, Windows Vista SP1 or later, Windows XP SP3, Windows XP SP2 x64 Edition, Windows Server 2008 (Server Core not supported), Windows Server 2008 R2 (Server Core supported with SP1 or later), Windows Server 2003 SP2

**Assembly:** Optimização (in Optimização.exe)

Methods

[Equals](http://msdn.microsoft.com/en-us/library/system.object.equals.aspx) (inherited from [Object](http://msdn.microsoft.com/en-us/library/system.object.aspx)), [GetHashCode](http://msdn.microsoft.com/en-us/library/system.object.gethashcode.aspx) (inherited from [Object](http://msdn.microsoft.com/en-us/library/system.object.aspx)), [GetType](http://msdn.microsoft.com/en-us/library/system.object.gettype.aspx) (inherited from [Object](http://msdn.microsoft.com/en-us/library/system.object.aspx)), [ReferenceEquals](http://msdn.microsoft.com/en-us/library/system.object.referenceequals.aspx) (inherited from [Object](http://msdn.microsoft.com/en-us/library/system.object.aspx)), [ToString](http://msdn.microsoft.com/en-us/library/system.object.tostring.aspx) (inherited from [Object](http://msdn.microsoft.com/en-us/library/system.object.aspx)), [callFunction](#topic_0000000000000013), [function1](#topic_0000000000000014), [function10](#topic_000000000000001E), [function11](#topic_000000000000001F), [function12](#topic_0000000000000020), [function13](#topic_0000000000000021), [function14](#topic_0000000000000022), [function15](#topic_0000000000000023), [function16](#topic_0000000000000024), [function17](#topic_0000000000000025), [function2](#topic_0000000000000015), [function3](#topic_0000000000000016), [function4](#topic_0000000000000018), [function5](#topic_0000000000000019), [function6](#topic_000000000000001A), [function7](#topic_000000000000001B), [function8](#topic_000000000000001C), [function9](#topic_000000000000001D), [gauss](#topic_0000000000000017), [realFunction1](#topic_0000000000000026)

Functions.callFunction Method

|  |  |
| --- | --- |
| C# |  |
| public static [double](http://msdn.microsoft.com/en-us/library/system.double.aspx) callFunction(  [functionName](#) *function*,  [double](http://msdn.microsoft.com/en-us/library/system.double.aspx)[] *parameters* ) | |

Parameters

function

|  |
| --- |
|  |

parameters

|  |
| --- |
|  |

Source code

|  |
| --- |
| public static double callFunction(functionName function, double[] parameters)  {  Functions functions = new Functions();  double ret;    switch (function){  case functionName.Sphere : ret = functions.function1(parameters.Length, parameters); break;  case functionName.Rosenbrock : ret = functions.function2(parameters.Length, parameters); break;  case functionName.DeJongStep: ret = functions.function3(parameters.Length, parameters); break;  case functionName.DeJongStep4: ret = functions.function4(parameters.Length, parameters); break;  case functionName.ShekelsFoxholes: ret = functions.function5(parameters); break;  case functionName.Schaffer: ret = functions.function6(parameters[0], parameters[1]); break;  case functionName.Function7: ret = functions.function7(parameters[0], parameters[1]); break;  case functionName.Sphere2: ret = functions.function8(parameters.Length, parameters); break;  case functionName.Schwefel: ret = functions.function9(parameters.Length, parameters); break;  case functionName.Ackley: ret = functions.function10(parameters.Length, parameters); break;  case functionName.Rastrigin: ret = functions.function11(parameters.Length, parameters); break;  case functionName.Schwefel2: ret = functions.function12(parameters.Length, parameters); break;  case functionName.Griewangk: ret = functions.function13(parameters.Length, parameters); break;  case functionName.Schwefel3: ret = functions.function14(parameters.Length, parameters); break;  case functionName.Rosenbrock2: ret = functions.function15(parameters.Length, parameters); break;  case functionName.Bohachevsky: ret = functions.function16(parameters.Length, parameters); break;  case functionName.DynamicControlProblem: ret = functions.function17(parameters.Length, parameters); break;  default: ret = -4747474747; break;  }  return ret;  } |

Requirements

**Platforms:** Windows 8, Windows Server 2012, Windows 7, Windows Vista SP1 or later, Windows XP SP3, Windows XP SP2 x64 Edition, Windows Server 2008 (Server Core not supported), Windows Server 2008 R2 (Server Core supported with SP1 or later), Windows Server 2003 SP2

See Also

Applies to: [Functions](#topic_0000000000000012)

Functions.function1 Method

Function 1 -- Sphere

|  |  |
| --- | --- |
| C# |  |
| public [double](http://msdn.microsoft.com/en-us/library/system.double.aspx) function1(  [int](http://msdn.microsoft.com/en-us/library/system.int32.aspx) *n*,  [double](http://msdn.microsoft.com/en-us/library/system.double.aspx)[] *x* ) | |

Parameters

n

|  |
| --- |
| Size of dimension |

x

|  |
| --- |
| Table of Xi |

Returns

The result of the function

Source code

|  |
| --- |
| public double function1(int n, double[] x)  {  double ret = 0;  for (int i = 0; i < n; i++)  {  ret = ret + (x[i] \* x[i]);  }  return ret;  } |

Requirements

**Platforms:** Windows 8, Windows Server 2012, Windows 7, Windows Vista SP1 or later, Windows XP SP3, Windows XP SP2 x64 Edition, Windows Server 2008 (Server Core not supported), Windows Server 2008 R2 (Server Core supported with SP1 or later), Windows Server 2003 SP2

See Also

Applies to: [Functions](#topic_0000000000000012)

Functions.function10 Method

Function 10 -- Ackley

|  |  |
| --- | --- |
| C# |  |
| public [double](http://msdn.microsoft.com/en-us/library/system.double.aspx) function10(  [int](http://msdn.microsoft.com/en-us/library/system.int32.aspx) *n*,  [double](http://msdn.microsoft.com/en-us/library/system.double.aspx)[] *x* ) | |

Parameters

n

|  |
| --- |
| Size of dimension |

x

|  |
| --- |
| Table of Xi |

Returns

The result of the function

Source code

|  |
| --- |
| public double function10(int n, double[] x)  {  double ret = 0;  double sum1 = 0;  double sum2 = 0;    for (int i = 0; i < n; i++)  {  sum1 = sum1 + Math.Pow(x[i], 2);  sum2 = sum2 + Math.Cos(2 \* Math.PI \* x[i]);  }  double ret1 = -20 \* Math.Exp(-0.2 \* Math.Sqrt(1 / n \* sum1));  ret = ret1 - Math.Exp(sum2 / n) + 20 + Math.E;  return ret;  } |

Requirements

**Platforms:** Windows 8, Windows Server 2012, Windows 7, Windows Vista SP1 or later, Windows XP SP3, Windows XP SP2 x64 Edition, Windows Server 2008 (Server Core not supported), Windows Server 2008 R2 (Server Core supported with SP1 or later), Windows Server 2003 SP2

See Also

Applies to: [Functions](#topic_0000000000000012)

Functions.function11 Method

Function 11 -- Rastrigin

|  |  |
| --- | --- |
| C# |  |
| public [double](http://msdn.microsoft.com/en-us/library/system.double.aspx) function11(  [int](http://msdn.microsoft.com/en-us/library/system.int32.aspx) *n*,  [double](http://msdn.microsoft.com/en-us/library/system.double.aspx)[] *x* ) | |

Parameters

n

|  |
| --- |
| Size of dimension |

x

|  |
| --- |
| Table of Xi |

Returns

The result of the function

Source code

|  |
| --- |
| public double function11(int n, double[] x)  {  double ret = 0;  double sum = 0;    for (int i = 0; i < n; i++)  {  sum = sum + (Math.Pow(x[i], 2) - 10 \* Math.Cos(2 \* Math.PI \* x[i]));  }  ret = 10 \* n + sum;  return ret;  } |

Requirements

**Platforms:** Windows 8, Windows Server 2012, Windows 7, Windows Vista SP1 or later, Windows XP SP3, Windows XP SP2 x64 Edition, Windows Server 2008 (Server Core not supported), Windows Server 2008 R2 (Server Core supported with SP1 or later), Windows Server 2003 SP2

See Also

Applies to: [Functions](#topic_0000000000000012)

Functions.function12 Method

Function 12 -- Schwefel

|  |  |
| --- | --- |
| C# |  |
| public [double](http://msdn.microsoft.com/en-us/library/system.double.aspx) function12(  [int](http://msdn.microsoft.com/en-us/library/system.int32.aspx) *n*,  [double](http://msdn.microsoft.com/en-us/library/system.double.aspx)[] *x* ) | |

Parameters

n

|  |
| --- |
| Size of dimension |

x

|  |
| --- |
| Table of Xi |

Returns

The result of the function

Source code

|  |
| --- |
| public double function12(int n, double[] x)  {  double ret = 0;    for (int i = 0; i < n; i++)  {  ret = ret + -x[i] \* Math.Sin(Math.Sqrt(Math.Abs(x[i])));  }  return ret;  } |

Requirements

**Platforms:** Windows 8, Windows Server 2012, Windows 7, Windows Vista SP1 or later, Windows XP SP3, Windows XP SP2 x64 Edition, Windows Server 2008 (Server Core not supported), Windows Server 2008 R2 (Server Core supported with SP1 or later), Windows Server 2003 SP2

See Also

Applies to: [Functions](#topic_0000000000000012)

Functions.function13 Method

Function 13 -- Griewangk

|  |  |
| --- | --- |
| C# |  |
| public [double](http://msdn.microsoft.com/en-us/library/system.double.aspx) function13(  [int](http://msdn.microsoft.com/en-us/library/system.int32.aspx) *n*,  [double](http://msdn.microsoft.com/en-us/library/system.double.aspx)[] *x* ) | |

Parameters

n

|  |
| --- |
| Size of dimension |

x

|  |
| --- |
| Table of Xi |

Returns

The result of the function

Source code

|  |
| --- |
| public double function13(int n, double[] x)  {  double ret = 0;  double sum = 0;  double prod = 1;    for (int i = 0; i < n; i++)  {  sum = sum + (Math.Pow(x[i], 2) / 4000);  prod = prod \* (Math.Cos(x[i] / Math.Sqrt(i + 1)));  }  ret = 1 + sum - prod;  return ret;  } |

Requirements

**Platforms:** Windows 8, Windows Server 2012, Windows 7, Windows Vista SP1 or later, Windows XP SP3, Windows XP SP2 x64 Edition, Windows Server 2008 (Server Core not supported), Windows Server 2008 R2 (Server Core supported with SP1 or later), Windows Server 2003 SP2

See Also

Applies to: [Functions](#topic_0000000000000012)

Functions.function14 Method

Function 14 -- Schwefel's pro1.2

|  |  |
| --- | --- |
| C# |  |
| public [double](http://msdn.microsoft.com/en-us/library/system.double.aspx) function14(  [int](http://msdn.microsoft.com/en-us/library/system.int32.aspx) *n*,  [double](http://msdn.microsoft.com/en-us/library/system.double.aspx)[] *x* ) | |

Parameters

n

|  |
| --- |
| Size of dimension |

x

|  |
| --- |
| Table of Xi |

Returns

The result of the function

Source code

|  |
| --- |
| public double function14(int n, double[] x)  {  double ret = 0;  double sum;    for (int i = 0; i < n; i++)  {  sum = 0;  for (int j = 0; j < i; j++)  {  sum = sum + x[j];  }  ret = ret + Math.Pow(sum, 2);  }  return ret;  } |

Requirements

**Platforms:** Windows 8, Windows Server 2012, Windows 7, Windows Vista SP1 or later, Windows XP SP3, Windows XP SP2 x64 Edition, Windows Server 2008 (Server Core not supported), Windows Server 2008 R2 (Server Core supported with SP1 or later), Windows Server 2003 SP2

See Also

Applies to: [Functions](#topic_0000000000000012)

Functions.function15 Method

Function 15 -- Rosenbrock

|  |  |
| --- | --- |
| C# |  |
| public [double](http://msdn.microsoft.com/en-us/library/system.double.aspx) function15(  [int](http://msdn.microsoft.com/en-us/library/system.int32.aspx) *n*,  [double](http://msdn.microsoft.com/en-us/library/system.double.aspx)[] *x* ) | |

Parameters

n

|  |
| --- |
| Size of dimension |

x

|  |
| --- |
| Table of Xi |

Returns

The result of the function

Source code

|  |
| --- |
| public double function15(int n, double[] x)  {  double ret = 0;    for (int i = 0; i < n - 1; i++)  {  ret = ret + 100 \* Math.Pow((Math.Pow(x[i], 2) - x[i + 1]), 2) + Math.Pow((1 - x[i]), 2);  }  return ret;  } |

Requirements

**Platforms:** Windows 8, Windows Server 2012, Windows 7, Windows Vista SP1 or later, Windows XP SP3, Windows XP SP2 x64 Edition, Windows Server 2008 (Server Core not supported), Windows Server 2008 R2 (Server Core supported with SP1 or later), Windows Server 2003 SP2

See Also

Applies to: [Functions](#topic_0000000000000012)

Functions.function16 Method

Function 16 -- Bohachevsky

|  |  |
| --- | --- |
| C# |  |
| public [double](http://msdn.microsoft.com/en-us/library/system.double.aspx) function16(  [int](http://msdn.microsoft.com/en-us/library/system.int32.aspx) *n*,  [double](http://msdn.microsoft.com/en-us/library/system.double.aspx)[] *x* ) | |

Parameters

n

|  |
| --- |
| Size of dimension |

x

|  |
| --- |
| Table of Xi |

Returns

The result of the function

Source code

|  |
| --- |
| public double function16(int n, double[] x)  {  double ret = 0;    for (int i = 0; i < n - 1; i++)  {  ret = ret + Math.Pow(x[i], 2) + Math.Pow(2 \* x[i + 1], 2) - 0.3 \* Math.Cos(3 \* Math.PI \* x[i]) - 0.4 \* Math.Cos(4 \* Math.PI \* x[i + 1]) + 0.7;  }  return ret;  } |

Requirements

**Platforms:** Windows 8, Windows Server 2012, Windows 7, Windows Vista SP1 or later, Windows XP SP3, Windows XP SP2 x64 Edition, Windows Server 2008 (Server Core not supported), Windows Server 2008 R2 (Server Core supported with SP1 or later), Windows Server 2003 SP2

See Also

Applies to: [Functions](#topic_0000000000000012)

Functions.function17 Method

Function 17 -- Dynamic control problem

|  |  |
| --- | --- |
| C# |  |
| public [double](http://msdn.microsoft.com/en-us/library/system.double.aspx) function17(  [int](http://msdn.microsoft.com/en-us/library/system.int32.aspx) *n*,  [double](http://msdn.microsoft.com/en-us/library/system.double.aspx)[] *x* ) | |

Parameters

n

|  |
| --- |
| Size of dimension |

x

|  |
| --- |
| Table of Xi |

Returns

The result of the function

Source code

|  |
| --- |
| public double function17(int n, double[] x)  {  double ret = 0;  double mu = 0;    for (int i = 0; i < n - 1; i++)  {  ret = ret + Math.Pow(x[i], 2) + Math.Pow(mu, 2);  }  ret = ret + x[n - 1];  return ret;  } |

Requirements

**Platforms:** Windows 8, Windows Server 2012, Windows 7, Windows Vista SP1 or later, Windows XP SP3, Windows XP SP2 x64 Edition, Windows Server 2008 (Server Core not supported), Windows Server 2008 R2 (Server Core supported with SP1 or later), Windows Server 2003 SP2

See Also

Applies to: [Functions](#topic_0000000000000012)

Functions.function2 Method

Function 2 -- Rosenbrock

|  |  |
| --- | --- |
| C# |  |
| public [double](http://msdn.microsoft.com/en-us/library/system.double.aspx) function2(  [int](http://msdn.microsoft.com/en-us/library/system.int32.aspx) *n*,  [double](http://msdn.microsoft.com/en-us/library/system.double.aspx)[] *x* ) | |

Parameters

n

|  |
| --- |
| Size of dimension |

x

|  |
| --- |
| Table of Xi |

Returns

The result of the function

Source code

|  |
| --- |
| public double function2(int n, double[] x)  {  double ret = 0;  for (int i = 0; i < n - 1; i++)  {  ret = ret + 100 \* Math.Pow((Math.Pow(x[i], 2) - x[i + 1]), 2) + Math.Pow((1 - x[i]), 2);  }  return ret;  } |

Requirements

**Platforms:** Windows 8, Windows Server 2012, Windows 7, Windows Vista SP1 or later, Windows XP SP3, Windows XP SP2 x64 Edition, Windows Server 2008 (Server Core not supported), Windows Server 2008 R2 (Server Core supported with SP1 or later), Windows Server 2003 SP2

See Also

Applies to: [Functions](#topic_0000000000000012)

Functions.function3 Method

Function 3 -- De Jong step Func

|  |  |
| --- | --- |
| C# |  |
| public [double](http://msdn.microsoft.com/en-us/library/system.double.aspx) function3(  [int](http://msdn.microsoft.com/en-us/library/system.int32.aspx) *n*,  [double](http://msdn.microsoft.com/en-us/library/system.double.aspx)[] *x* ) | |

Parameters

n

|  |
| --- |
| Size of dimension |

x

|  |
| --- |
| Table of Xi |

Returns

The result of the function

Source code

|  |
| --- |
| public double function3(int n, double[] x)  {  double ret = 0;  for (int i = 0; i < n; i++)  {  ret = ret + Math.Round(x[i]);  }  return ret;  } |

Requirements

**Platforms:** Windows 8, Windows Server 2012, Windows 7, Windows Vista SP1 or later, Windows XP SP3, Windows XP SP2 x64 Edition, Windows Server 2008 (Server Core not supported), Windows Server 2008 R2 (Server Core supported with SP1 or later), Windows Server 2003 SP2

See Also

Applies to: [Functions](#topic_0000000000000012)

Functions.function4 Method

Function 4 -- De Jong step Func 4

|  |  |
| --- | --- |
| C# |  |
| public [double](http://msdn.microsoft.com/en-us/library/system.double.aspx) function4(  [int](http://msdn.microsoft.com/en-us/library/system.int32.aspx) *n*,  [double](http://msdn.microsoft.com/en-us/library/system.double.aspx)[] *x* ) | |

Parameters

n

|  |
| --- |
|  |

x

|  |
| --- |
|  |

Source code

|  |
| --- |
| public double function4(int n, double[] x)  {  double ret = 0;  double mu = 0;  double o = 1;    for (int i = 0; i < n; i++)  {  ret = ret + (i + 1) \* Math.Pow(x[i], 4) + gauss(mu, o, x[i]);  }  return ret;  } |

Requirements

**Platforms:** Windows 8, Windows Server 2012, Windows 7, Windows Vista SP1 or later, Windows XP SP3, Windows XP SP2 x64 Edition, Windows Server 2008 (Server Core not supported), Windows Server 2008 R2 (Server Core supported with SP1 or later), Windows Server 2003 SP2

See Also

Applies to: [Functions](#topic_0000000000000012)

Functions.function5 Method

Function 5 -- Shekel's Foxholes

|  |  |
| --- | --- |
| C# |  |
| public [double](http://msdn.microsoft.com/en-us/library/system.double.aspx) function5(  [double](http://msdn.microsoft.com/en-us/library/system.double.aspx)[] *x* ) | |

Parameters

x

|  |
| --- |
|  |

Source code

|  |
| --- |
| public double function5(double[] x)  {  double ret = 0;  int[][] a = {   new int[] {-32, -16, 0, 16, 32, -32, -16, 0, 16, 32, -32, -16, 0, 16, 32, -32, -16, 0, 16, 32, -32, -16, 0, 16, 32 },   new int[] {-32, -32, -32, -32, -32, -16, -16, -16, -16, -16, 0, 0, 0, 0, 0, 16, 16, 16, 16, 16, 32, 32, 32, 32, 32 }   };    double sum = 0;  double sum2 = 0;    for (int j = 0; j < 25; j++)  {  for (int i = 0; i < 2; i++)  {  sum = sum + Math.Pow(x[i] - a[i][j], 6);  }  sum2 = sum2 + 1 / (j + 1 + sum);  }  ret = sum2 + 0.002;  return ret;  } |

Requirements

**Platforms:** Windows 8, Windows Server 2012, Windows 7, Windows Vista SP1 or later, Windows XP SP3, Windows XP SP2 x64 Edition, Windows Server 2008 (Server Core not supported), Windows Server 2008 R2 (Server Core supported with SP1 or later), Windows Server 2003 SP2

See Also

Applies to: [Functions](#topic_0000000000000012)

Functions.function6 Method

Function 6 -- Schaffer

|  |  |
| --- | --- |
| C# |  |
| public [double](http://msdn.microsoft.com/en-us/library/system.double.aspx) function6(  [double](http://msdn.microsoft.com/en-us/library/system.double.aspx) *x1*,  [double](http://msdn.microsoft.com/en-us/library/system.double.aspx) *x2* ) | |

Parameters

x1

|  |
| --- |
|  |

x2

|  |
| --- |
|  |

Source code

|  |
| --- |
| public double function6(double x1, double x2)  {  double ret = 0;    double sum = Math.Pow(x1, 2) + Math.Pow(x2, 2);  ret = Math.Pow(sum, 0.25) \* (Math.Pow(Math.Sin(50 \* Math.Pow(sum, 0.1)), 2) + 1);  return ret;  } |

Requirements

**Platforms:** Windows 8, Windows Server 2012, Windows 7, Windows Vista SP1 or later, Windows XP SP3, Windows XP SP2 x64 Edition, Windows Server 2008 (Server Core not supported), Windows Server 2008 R2 (Server Core supported with SP1 or later), Windows Server 2003 SP2

See Also

Applies to: [Functions](#topic_0000000000000012)

Functions.function7 Method

Function 7 -- Sem nome

|  |  |
| --- | --- |
| C# |  |
| public [double](http://msdn.microsoft.com/en-us/library/system.double.aspx) function7(  [double](http://msdn.microsoft.com/en-us/library/system.double.aspx) *x1*,  [double](http://msdn.microsoft.com/en-us/library/system.double.aspx) *x2* ) | |

Parameters

x1

|  |
| --- |
|  |

x2

|  |
| --- |
|  |

Source code

|  |
| --- |
| public double function7(double x1, double x2)  {  double ret = 0;    double sum = Math.Pow(x1, 2) + Math.Pow(x2, 2);  ret = sum / 2 - Math.Cos(20 \* Math.PI \* x1) \* Math.Cos(20 \* Math.PI \* x2) + 2;  return ret;  } |

Requirements

**Platforms:** Windows 8, Windows Server 2012, Windows 7, Windows Vista SP1 or later, Windows XP SP3, Windows XP SP2 x64 Edition, Windows Server 2008 (Server Core not supported), Windows Server 2008 R2 (Server Core supported with SP1 or later), Windows Server 2003 SP2

See Also

Applies to: [Functions](#topic_0000000000000012)

Functions.function8 Method

Function 8 -- Sphere mode

|  |  |
| --- | --- |
| C# |  |
| public [double](http://msdn.microsoft.com/en-us/library/system.double.aspx) function8(  [int](http://msdn.microsoft.com/en-us/library/system.int32.aspx) *n*,  [double](http://msdn.microsoft.com/en-us/library/system.double.aspx)[] *x* ) | |

Parameters

n

|  |
| --- |
| Size of dimension |

x

|  |
| --- |
| Table of Xi |

Returns

The result of the function

Source code

|  |
| --- |
| public double function8(int n, double[] x)  {  double ret = 0;  for (int i = 0; i < n; i++)  {  ret = ret + (x[i] \* x[i]);  }    return ret;  } |

Requirements

**Platforms:** Windows 8, Windows Server 2012, Windows 7, Windows Vista SP1 or later, Windows XP SP3, Windows XP SP2 x64 Edition, Windows Server 2008 (Server Core not supported), Windows Server 2008 R2 (Server Core supported with SP1 or later), Windows Server 2003 SP2

See Also

Applies to: [Functions](#topic_0000000000000012)

Functions.function9 Method

Function 9 -- Schwefel

|  |  |
| --- | --- |
| C# |  |
| public [double](http://msdn.microsoft.com/en-us/library/system.double.aspx) function9(  [int](http://msdn.microsoft.com/en-us/library/system.int32.aspx) *n*,  [double](http://msdn.microsoft.com/en-us/library/system.double.aspx)[] *x* ) | |

Parameters

n

|  |
| --- |
| Size of dimension |

x

|  |
| --- |
| Table of Xi |

Returns

The result of the function

Source code

|  |
| --- |
| public double function9(int n, double[] x)  {  double ret = 0;  for (int i = 0; i < n; i++)  {  ret = ret + Math.Pow(x[i] + 0.5, 2);  }    return ret;  } |

Requirements

**Platforms:** Windows 8, Windows Server 2012, Windows 7, Windows Vista SP1 or later, Windows XP SP3, Windows XP SP2 x64 Edition, Windows Server 2008 (Server Core not supported), Windows Server 2008 R2 (Server Core supported with SP1 or later), Windows Server 2003 SP2

See Also

Applies to: [Functions](#topic_0000000000000012)

Functions.gauss Method

Function 4 -- De Jong step Func 4
Gaussian function

|  |  |
| --- | --- |
| C# |  |
| private [double](http://msdn.microsoft.com/en-us/library/system.double.aspx) gauss(  [double](http://msdn.microsoft.com/en-us/library/system.double.aspx) *mu*,  [double](http://msdn.microsoft.com/en-us/library/system.double.aspx) *o*,  [double](http://msdn.microsoft.com/en-us/library/system.double.aspx) *x* ) | |

Parameters

mu

|  |
| --- |
| Expectation of Gaussian function |

o

|  |
| --- |
| Standard deviation of Gaussian function |

x

|  |
| --- |
| The variable Xi |

Returns

The result of the Gaussian function

Source code

|  |
| --- |
| private double gauss(double mu, double o, double x)  {  double pow = -(Math.Pow((x - mu), 2) / (2 \* Math.Pow(o, 2)));  double ret = 1 / (o \* Math.Sqrt(2 \* Math.PI)) \* Math.Pow(Math.E, pow);  return ret;  } |

Requirements

**Platforms:** Windows 8, Windows Server 2012, Windows 7, Windows Vista SP1 or later, Windows XP SP3, Windows XP SP2 x64 Edition, Windows Server 2008 (Server Core not supported), Windows Server 2008 R2 (Server Core supported with SP1 or later), Windows Server 2003 SP2

See Also

Applies to: [Functions](#topic_0000000000000012)

Functions.realFunction1 Method

|  |  |
| --- | --- |
| C# |  |
| public [double](http://msdn.microsoft.com/en-us/library/system.double.aspx) realFunction1(  [double](http://msdn.microsoft.com/en-us/library/system.double.aspx) *x1*,  [double](http://msdn.microsoft.com/en-us/library/system.double.aspx) *x2*,  [double](http://msdn.microsoft.com/en-us/library/system.double.aspx) *x3*,  [double](http://msdn.microsoft.com/en-us/library/system.double.aspx) *x4* ) | |

Parameters

x1

|  |
| --- |
|  |

x2

|  |
| --- |
|  |

x3

|  |
| --- |
|  |

x4

|  |
| --- |
|  |

Source code

|  |
| --- |
| public double realFunction1(double x1, double x2, double x3, double x4)  {  double ret = 0;    //finir valeur pour contraintes  double m = 6.000 \* (14 + x2 / 2);  double r = Math.Sqrt(Math.Pow(x2, 2) / 4 + Math.Pow((x1 + x3) / 2, 2));  double j = 2 \* (x1 \* x2 \* Math.Sqrt(2) \* (Math.Pow(x2, 2) / 12 + Math.Pow((x1 + x3) / 2, 2)));  double tPrime = 6.000 / (Math.Sqrt(2) \* x1 \* x2);  double tPrimePrime = (m \* r) / j;  double t = Math.Sqrt(Math.Pow(tPrime, 2) + (2 \* tPrime \* tPrimePrime \* x2) / (2 \* r) + Math.Pow(tPrimePrime, 2));    //finir contraintes  bool g1 = (t - 13.600 <= 0) ? true : false;  bool g2 = (t - 13.600 <= 0) ? true : false;  bool g3 = (x1 - x4 <= 0) ? true : false;  bool g4 = (0.10471 \* Math.Pow(x1, 2) + 0.04811 \* x3 \* x4 \* (14 + x2) - 5.0 <= 0) ? true : false;  bool g5 = (0.125 - x1 <= 0) ? true : false;  bool g6 = (t <= 0) ? true : false;  bool g7 = (6.000 <= 0) ? true : false;    // False value  if (!(g1 && g2 && g3 && g4 && g5 && g6 && g7))  return 0;    ret = 1.01471 \* Math.Pow(x1, 2) \* x2 + 0.04811 \* x3 \* x4 \* (14.0 + x2);  return ret;  } |

Requirements

**Platforms:** Windows 8, Windows Server 2012, Windows 7, Windows Vista SP1 or later, Windows XP SP3, Windows XP SP2 x64 Edition, Windows Server 2008 (Server Core not supported), Windows Server 2008 R2 (Server Core supported with SP1 or later), Windows Server 2003 SP2

See Also

Applies to: [Functions](#topic_0000000000000012)

Tools Class

Class with tools for conversion

**Optimização.Tools**

|  |  |
| --- | --- |
| C# |  |
| public class Tools | |

Requirements

**Namespace:**[Optimização](#topic_0000000000000000)

**Platforms:** Windows 8, Windows Server 2012, Windows 7, Windows Vista SP1 or later, Windows XP SP3, Windows XP SP2 x64 Edition, Windows Server 2008 (Server Core not supported), Windows Server 2008 R2 (Server Core supported with SP1 or later), Windows Server 2003 SP2

**Assembly:** Optimização (in Optimização.exe)

Methods

[Equals](http://msdn.microsoft.com/en-us/library/system.object.equals.aspx) (inherited from [Object](http://msdn.microsoft.com/en-us/library/system.object.aspx)), [GetHashCode](http://msdn.microsoft.com/en-us/library/system.object.gethashcode.aspx) (inherited from [Object](http://msdn.microsoft.com/en-us/library/system.object.aspx)), [GetType](http://msdn.microsoft.com/en-us/library/system.object.gettype.aspx) (inherited from [Object](http://msdn.microsoft.com/en-us/library/system.object.aspx)), [ReferenceEquals](http://msdn.microsoft.com/en-us/library/system.object.referenceequals.aspx) (inherited from [Object](http://msdn.microsoft.com/en-us/library/system.object.aspx)), [ToString](http://msdn.microsoft.com/en-us/library/system.object.tostring.aspx) (inherited from [Object](http://msdn.microsoft.com/en-us/library/system.object.aspx)), [binToDecProportional](#topic_0000000000000028), [decToBinProportional](#topic_0000000000000029)

Tools.binToDecProportional Method

|  |  |
| --- | --- |
| C# |  |
| public static [double](http://msdn.microsoft.com/en-us/library/system.double.aspx) binToDecProportional(  [string](http://msdn.microsoft.com/en-us/library/system.string.aspx) *from*,  [double](http://msdn.microsoft.com/en-us/library/system.double.aspx) *min*,  [double](http://msdn.microsoft.com/en-us/library/system.double.aspx) *max* ) | |

Parameters

from

|  |
| --- |
|  |

min

|  |
| --- |
|  |

max

|  |
| --- |
|  |

Source code

|  |
| --- |
| public static double binToDecProportional(string from, double min, double max)  {  double to;  double max\_bin = Math.Pow(2, nb\_bit);    int val\_bin = Convert.ToInt32(from, 2);  to = (val\_bin / max\_bin) \* (max - min) + min;    return to;  } |

Requirements

**Platforms:** Windows 8, Windows Server 2012, Windows 7, Windows Vista SP1 or later, Windows XP SP3, Windows XP SP2 x64 Edition, Windows Server 2008 (Server Core not supported), Windows Server 2008 R2 (Server Core supported with SP1 or later), Windows Server 2003 SP2

See Also

Applies to: [Tools](#topic_0000000000000027)

Tools.decToBinProportional Method

|  |  |
| --- | --- |
| C# |  |
| public static [string](http://msdn.microsoft.com/en-us/library/system.string.aspx) decToBinProportional(  [double](http://msdn.microsoft.com/en-us/library/system.double.aspx) *from*,  [double](http://msdn.microsoft.com/en-us/library/system.double.aspx) *min*,  [double](http://msdn.microsoft.com/en-us/library/system.double.aspx) *max* ) | |

Parameters

from

|  |
| --- |
|  |

min

|  |
| --- |
|  |

max

|  |
| --- |
|  |

Source code

|  |
| --- |
| public static string decToBinProportional(double from, double min, double max)  {  string to;  double max\_bin = Math.Pow(2, nb\_bit);    double val\_bin = Math.Round(((from - min) / (max - min)) \* max\_bin);  to = Convert.ToString((int)val\_bin, 2);    return to;  } |

Requirements

**Platforms:** Windows 8, Windows Server 2012, Windows 7, Windows Vista SP1 or later, Windows XP SP3, Windows XP SP2 x64 Edition, Windows Server 2008 (Server Core not supported), Windows Server 2008 R2 (Server Core supported with SP1 or later), Windows Server 2003 SP2

See Also

Applies to: [Tools](#topic_0000000000000027)

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