"C:\Program Files\Java\jdk-11.0.2\bin\java.exe" "-javaagent:D:\intellijUltimate\IntelliJ IDEA 2019.2.3\lib\idea\_rt.jar=54904:D:\intellijUltimate\IntelliJ IDEA 2019.2.3\bin" -Dfile.encoding=UTF-8 -classpath E:\jMetal\jMetal-master\jmetal-exec\target\classes;E:\jMetal\jMetal-master\jmetal-core\target\classes;C:\Users\Eason\.m2\repository\org\apache\maven\reporting\maven-reporting-api\3.0\maven-reporting-api-3.0.jar;C:\Users\Eason\.m2\repository\org\apache\maven\doxia\doxia-sink-api\1.0\doxia-sink-api-1.0.jar;C:\Users\Eason\.m2\repository\org\apache\commons\commons-lang3\3.3.2\commons-lang3-3.3.2.jar;C:\Users\Eason\.m2\repository\org\apache\commons\commons-collections4\4.2\commons-collections4-4.2.jar;C:\Users\Eason\.m2\repository\commons-io\commons-io\2.4\commons-io-2.4.jar;C:\Users\Eason\.m2\repository\org\hamcrest\hamcrest-all\1.3\hamcrest-all-1.3.jar;C:\Users\Eason\.m2\repository\org\apache\commons\commons-math3\3.6.1\commons-math3-3.6.1.jar;C:\Users\Eason\.m2\repository\nz\ac\waikato\cms\weka\weka-stable\3.8.1\weka-stable-3.8.1.jar;C:\Users\Eason\.m2\repository\nz\ac\waikato\cms\weka\thirdparty\java-cup-11b\2015.03.26\java-cup-11b-2015.03.26.jar;C:\Users\Eason\.m2\repository\nz\ac\waikato\cms\weka\thirdparty\java-cup-11b-runtime\2015.03.26\java-cup-11b-runtime-2015.03.26.jar;C:\Users\Eason\.m2\repository\nz\ac\waikato\cms\weka\thirdparty\bounce\0.18\bounce-0.18.jar;C:\Users\Eason\.m2\repository\com\googlecode\matrix-toolkits-java\mtj\1.0.4\mtj-1.0.4.jar;C:\Users\Eason\.m2\repository\com\github\fommil\netlib\netlib-native\_ref-osx-x86\_64\1.1\netlib-native\_ref-osx-x86\_64-1.1-natives.jar;C:\Users\Eason\.m2\repository\com\github\fommil\netlib\native\_ref-java\1.1\native\_ref-java-1.1.jar;C:\Users\Eason\.m2\repository\com\github\fommil\jniloader\1.1\jniloader-1.1.jar;C:\Users\Eason\.m2\repository\com\github\fommil\netlib\netlib-native\_ref-linux-x86\_64\1.1\netlib-native\_ref-linux-x86\_64-1.1-natives.jar;C:\Users\Eason\.m2\repository\com\github\fommil\netlib\netlib-native\_ref-linux-i686\1.1\netlib-native\_ref-linux-i686-1.1-natives.jar;C:\Users\Eason\.m2\repository\com\github\fommil\netlib\netlib-native\_ref-win-x86\_64\1.1\netlib-native\_ref-win-x86\_64-1.1-natives.jar;C:\Users\Eason\.m2\repository\com\github\fommil\netlib\netlib-native\_ref-win-i686\1.1\netlib-native\_ref-win-i686-1.1-natives.jar;C:\Users\Eason\.m2\repository\com\github\fommil\netlib\netlib-native\_ref-linux-armhf\1.1\netlib-native\_ref-linux-armhf-1.1-natives.jar;C:\Users\Eason\.m2\repository\com\github\fommil\netlib\netlib-native\_system-osx-x86\_64\1.1\netlib-native\_system-osx-x86\_64-1.1-natives.jar;C:\Users\Eason\.m2\repository\com\github\fommil\netlib\native\_system-java\1.1\native\_system-java-1.1.jar;C:\Users\Eason\.m2\repository\com\github\fommil\netlib\netlib-native\_system-linux-x86\_64\1.1\netlib-native\_system-linux-x86\_64-1.1-natives.jar;C:\Users\Eason\.m2\repository\com\github\fommil\netlib\netlib-native\_system-linux-i686\1.1\netlib-native\_system-linux-i686-1.1-natives.jar;C:\Users\Eason\.m2\repository\com\github\fommil\netlib\netlib-native\_system-linux-armhf\1.1\netlib-native\_system-linux-armhf-1.1-natives.jar;C:\Users\Eason\.m2\repository\com\github\fommil\netlib\netlib-native\_system-win-x86\_64\1.1\netlib-native\_system-win-x86\_64-1.1-natives.jar;C:\Users\Eason\.m2\repository\com\github\fommil\netlib\netlib-native\_system-win-i686\1.1\netlib-native\_system-win-i686-1.1-natives.jar;C:\Users\Eason\.m2\repository\net\sourceforge\f2j\arpack\_combined\_all\0.1\arpack\_combined\_all-0.1.jar;C:\Users\Eason\.m2\repository\com\googlecode\netlib-java\netlib-java\1.1\netlib-java-1.1.jar;C:\Users\Eason\.m2\repository\com\github\fommil\netlib\core\1.1\core-1.1.jar;E:\jMetal\jMetal-master\jmetal-algorithm\target\classes;C:\Users\Eason\.m2\repository\com\fuzzylite\jfuzzylite\5.0\jfuzzylite-5.0.jar;E:\jMetal\jMetal-master\jmetal-problem\target\classes;C:\Users\Eason\.m2\repository\org\knowm\xchart\xchart\3.2.2\xchart-3.2.2.jar;C:\Users\Eason\.m2\repository\de\erichseifert\vectorgraphics2d\VectorGraphics2D\0.11\VectorGraphics2D-0.11.jar org.uma.jmetal.runner.multiobjective.Exercise4exec

2019-11-06 07:49:02.034 INFO: Loggers configured with null [org.uma.jmetal.util.JMetalLogger configureLoggers]

2019-11-06 07:49:02.077 INFO: Total execution time: 45ms [org.uma.jmetal.runner.multiobjective.NSGAIIRunner doAMicro]

2019-11-06 07:49:02.084 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.085 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.085 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.117 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.3556729445758162

Epsilon : 1.3556729445758162

GD (N) : 0.11688475302884113

GD : 0.11688475302884113

IGD (N) : 0.029968688489881185

IGD : 0.029968688489881185

IGD+ (N) : 0.6894201279738171

IGD+ : 0.6894201279738171

Spread (N) : 0.9926611810989199

Spread : 0.9926611810989199

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:49:02.150 INFO: Total execution time: 32ms [org.uma.jmetal.runner.multiobjective.NSGAIIRunner doAMicro]

2019-11-06 07:49:02.153 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.154 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.154 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.161 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.6292442487357854

Epsilon : 1.6292442487357854

GD (N) : 0.22281483316813336

GD : 0.22281483316813336

IGD (N) : 0.036734602910555934

IGD : 0.036734602910555934

IGD+ (N) : 0.962991432572806

IGD+ : 0.962991432572806

Spread (N) : 1.00984591048338

Spread : 1.00984591048338

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:49:02.179 INFO: Total execution time: 18ms [org.uma.jmetal.runner.multiobjective.NSGAIIRunner doAMicro]

2019-11-06 07:49:02.183 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.184 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.184 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.194 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.3596192501312045

Epsilon : 1.3596192501312045

GD (N) : 0.1246442092252498

GD : 0.1246442092252498

IGD (N) : 0.03005959394140858

IGD : 0.03005959394140858

IGD+ (N) : 0.6933664335292048

IGD+ : 0.6933664335292048

Spread (N) : 1.0146901987742558

Spread : 1.0146901987742558

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:49:02.215 INFO: Total execution time: 20ms [org.uma.jmetal.runner.multiobjective.NSGAIIRunner doAMicro]

2019-11-06 07:49:02.217 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.217 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.218 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.224 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.9173289903627828

Epsilon : 1.9173289903627828

GD (N) : 0.2956019887726423

GD : 0.2956019887726423

IGD (N) : 0.04458714803057068

IGD : 0.04458714803057068

IGD+ (N) : 1.2510761737607836

IGD+ : 1.2510761737607836

Spread (N) : 0.9990116563581791

Spread : 0.9990116563581791

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

bounds' problems1

2019-11-06 07:49:02.247 INFO: Total execution time: 22ms [org.uma.jmetal.runner.multiobjective.NSGAIIRunner doAMicro]

2019-11-06 07:49:02.249 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.250 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.250 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.259 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.2056785367881986

Epsilon : 1.2056785367881986

GD (N) : 0.07659624216999084

GD : 0.07659624216999084

IGD (N) : 0.026717078518178273

IGD : 0.026717078518178273

IGD+ (N) : 0.5394257201861987

IGD+ : 0.5394257201861987

Spread (N) : 1.0017181139183724

Spread : 1.0017181139183724

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:49:02.284 INFO: Total execution time: 25ms [org.uma.jmetal.runner.multiobjective.NSGAIIRunner doAMicro]

2019-11-06 07:49:02.286 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.287 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.287 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.292 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.612285651176923

Epsilon : 1.612285651176923

GD (N) : 0.2152109405207474

GD : 0.2152109405207474

IGD (N) : 0.036301519266280544

IGD : 0.036301519266280544

IGD+ (N) : 0.9460328345749216

IGD+ : 0.9460328345749216

Spread (N) : 0.9839208453960026

Spread : 0.9839208453960026

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:49:02.314 INFO: Total execution time: 21ms [org.uma.jmetal.runner.multiobjective.NSGAIIRunner doAMicro]

2019-11-06 07:49:02.316 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.316 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.317 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.321 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.5636480804617299

Epsilon : 1.5636480804617299

GD (N) : 0.1952478289625772

GD : 0.1952478289625772

IGD (N) : 0.03504483466282192

IGD : 0.03504483466282192

IGD+ (N) : 0.8973952638597291

IGD+ : 0.8973952638597291

Spread (N) : 0.9600936094358712

Spread : 0.9600936094358712

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:49:02.343 INFO: Total execution time: 21ms [org.uma.jmetal.runner.multiobjective.NSGAIIRunner doAMicro]

2019-11-06 07:49:02.345 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.345 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.346 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.350 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.4903818699130504

Epsilon : 1.4903818699130504

GD (N) : 0.16106707828575298

GD : 0.16106707828575298

IGD (N) : 0.03319654911974244

IGD : 0.03319654911974244

IGD+ (N) : 0.8241290533110517

IGD+ : 0.8241290533110517

Spread (N) : 0.9959348762887441

Spread : 0.9959348762887441

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:49:02.368 INFO: Total execution time: 18ms [org.uma.jmetal.runner.multiobjective.NSGAIIRunner doAMicro]

2019-11-06 07:49:02.370 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.370 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.371 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.373 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.2390538035372285

Epsilon : 1.2390538035372285

GD (N) : 0.08190517639634763

GD : 0.08190517639634763

IGD (N) : 0.027402877103805255

IGD : 0.027402877103805255

IGD+ (N) : 0.5728009869352905

IGD+ : 0.5728009869352905

Spread (N) : 0.9926918531026672

Spread : 0.9926918531026672

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:49:02.390 INFO: Total execution time: 17ms [org.uma.jmetal.runner.multiobjective.NSGAIIRunner doAMicro]

2019-11-06 07:49:02.392 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.392 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.393 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.395 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.8144399275996381

Epsilon : 1.8144399275996381

GD (N) : 0.26198899866245806

GD : 0.26198899866245806

IGD (N) : 0.041727159246772005

IGD : 0.041727159246772005

IGD+ (N) : 1.1481871109976394

IGD+ : 1.1481871109976394

Spread (N) : 0.9997147112633694

Spread : 0.9997147112633694

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:49:02.418 INFO: Total execution time: 23ms [org.uma.jmetal.runner.multiobjective.NSGAIIRunner doAMicro]

2019-11-06 07:49:02.420 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.421 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.421 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.427 INFO:

Hypervolume (N) : 0.09284661736199938

Hypervolume : 0.09284661736199938

Epsilon (N) : 0.4968554442435427

Epsilon : 0.4968554442435427

GD (N) : 0.07129834024123956

GD : 0.07129834024123956

IGD (N) : 0.007875658941392926

IGD : 0.007875658941392926

IGD+ (N) : 0.23867303861186925

IGD+ : 0.23867303861186925

Spread (N) : 0.7243390593075936

Spread : 0.7243390593075936

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

bounds' problems1

2019-11-06 07:49:02.447 INFO: Total execution time: 19ms [org.uma.jmetal.runner.multiobjective.NSGAIIRunner doAMicro]

2019-11-06 07:49:02.449 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.450 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.450 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.453 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.4735109700135716

Epsilon : 1.4735109700135716

GD (N) : 0.16186303678392172

GD : 0.16186303678392172

IGD (N) : 0.03277938228822449

IGD : 0.03277938228822449

IGD+ (N) : 0.8072581534115715

IGD+ : 0.8072581534115715

Spread (N) : 0.9977243805031877

Spread : 0.9977243805031877

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

bounds' problems1

2019-11-06 07:49:02.471 INFO: Total execution time: 18ms [org.uma.jmetal.runner.multiobjective.NSGAIIRunner doAMicro]

2019-11-06 07:49:02.473 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.473 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.474 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.476 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.0974984736865885

Epsilon : 1.0974984736865885

GD (N) : 0.06808286576620418

GD : 0.06808286576620418

IGD (N) : 0.0189735460045831

IGD : 0.0189735460045831

IGD+ (N) : 0.45751371844364547

IGD+ : 0.45751371844364547

Spread (N) : 1.030852065161143

Spread : 1.030852065161143

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:49:02.496 INFO: Total execution time: 19ms [org.uma.jmetal.runner.multiobjective.NSGAIIRunner doAMicro]

2019-11-06 07:49:02.498 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.499 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.499 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.502 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.5693844133909227

Epsilon : 1.5693844133909227

GD (N) : 0.18647404471138818

GD : 0.18647404471138818

IGD (N) : 0.03519188625316703

IGD : 0.03519188625316703

IGD+ (N) : 0.9031315967889231

IGD+ : 0.9031315967889231

Spread (N) : 0.9929488167605938

Spread : 0.9929488167605938

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:49:02.521 INFO: Total execution time: 17ms [org.uma.jmetal.runner.multiobjective.NSGAIIRunner doAMicro]

2019-11-06 07:49:02.523 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.523 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.523 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.526 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.2307800868094705

Epsilon : 1.2307800868094705

GD (N) : 0.07868656276891502

GD : 0.07868656276891502

IGD (N) : 0.027230740271878478

IGD : 0.027230740271878478

IGD+ (N) : 0.5645272702074704

IGD+ : 0.5645272702074704

Spread (N) : 0.9848951035120682

Spread : 0.9848951035120682

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:49:02.547 INFO: Total execution time: 20ms [org.uma.jmetal.runner.multiobjective.NSGAIIRunner doAMicro]

2019-11-06 07:49:02.550 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.551 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.551 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.555 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.4067965090983494

Epsilon : 1.4067965090983494

GD (N) : 0.19009046692231776

GD : 0.19009046692231776

IGD (N) : 0.02664327269462037

IGD : 0.02664327269462037

IGD+ (N) : 0.7866533735891306

IGD+ : 0.7866533735891306

Spread (N) : 0.9742414681156036

Spread : 0.9742414681156036

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:49:02.580 INFO: Total execution time: 25ms [org.uma.jmetal.runner.multiobjective.NSGAIIRunner doAMicro]

2019-11-06 07:49:02.583 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.583 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.583 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.587 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.7262668449019263

Epsilon : 1.7262668449019263

GD (N) : 0.24915988147311077

GD : 0.24915988147311077

IGD (N) : 0.03610041829308154

IGD : 0.03610041829308154

IGD+ (N) : 1.0682439276200872

IGD+ : 1.0682439276200872

Spread (N) : 1.0357938733164997

Spread : 1.0357938733164997

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:49:02.610 INFO: Total execution time: 22ms [org.uma.jmetal.runner.multiobjective.NSGAIIRunner doAMicro]

2019-11-06 07:49:02.613 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.614 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.614 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.618 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.495817698325492

Epsilon : 1.495817698325492

GD (N) : 0.20367349634441725

GD : 0.20367349634441725

IGD (N) : 0.029188782287964572

IGD : 0.029188782287964572

IGD+ (N) : 0.864065270043941

IGD+ : 0.864065270043941

Spread (N) : 0.9963781916638542

Spread : 0.9963781916638542

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:49:02.637 INFO: Total execution time: 19ms [org.uma.jmetal.runner.multiobjective.NSGAIIRunner doAMicro]

2019-11-06 07:49:02.640 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.640 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.640 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.643 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.0993845727292657

Epsilon : 1.0993845727292657

GD (N) : 0.03150424966311386

GD : 0.03150424966311386

IGD (N) : 0.02418559953706143

IGD : 0.02418559953706143

IGD+ (N) : 0.4331317561272659

IGD+ : 0.4331317561272659

Spread (N) : 1.0123374315745013

Spread : 1.0123374315745013

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:49:02.664 INFO: Total execution time: 21ms [org.uma.jmetal.runner.multiobjective.NSGAIIRunner doAMicro]

2019-11-06 07:49:02.667 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.667 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.667 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.670 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.314276431360225

Epsilon : 1.314276431360225

GD (N) : 0.10024114816871402

GD : 0.10024114816871402

IGD (N) : 0.029030273547323335

IGD : 0.029030273547323335

IGD+ (N) : 0.6480236147582246

IGD+ : 0.6480236147582246

Spread (N) : 1.0008569439228479

Spread : 1.0008569439228479

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:49:02.692 INFO: Total execution time: 22ms [org.uma.jmetal.runner.multiobjective.NSGAIIRunner doAMicro]

2019-11-06 07:49:02.694 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.694 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.695 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.698 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.298642284151544

Epsilon : 1.298642284151544

GD (N) : 0.09969736852984812

GD : 0.09969736852984812

IGD (N) : 0.02868342057035214

IGD : 0.02868342057035214

IGD+ (N) : 0.6323894675495442

IGD+ : 0.6323894675495442

Spread (N) : 1.0011195819826129

Spread : 1.0011195819826129

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:49:02.719 INFO: Total execution time: 20ms [org.uma.jmetal.runner.multiobjective.NSGAIIRunner doAMicro]

2019-11-06 07:49:02.721 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.722 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.722 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.725 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.35628425228542

Epsilon : 1.35628425228542

GD (N) : 0.12240097304855786

GD : 0.12240097304855786

IGD (N) : 0.029290172362397022

IGD : 0.029290172362397022

IGD+ (N) : 0.6900586792355781

IGD+ : 0.6900586792355781

Spread (N) : 0.984812189283207

Spread : 0.984812189283207

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:49:02.746 INFO: Total execution time: 20ms [org.uma.jmetal.runner.multiobjective.NSGAIIRunner doAMicro]

2019-11-06 07:49:02.748 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.749 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.749 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.752 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.0619618804485986

Epsilon : 1.0619618804485986

GD (N) : 0.05162299361135123

GD : 0.05162299361135123

IGD (N) : 0.01832882601076745

IGD : 0.01832882601076745

IGD+ (N) : 0.4139038968421836

IGD+ : 0.4139038968421836

Spread (N) : 0.9261249779271119

Spread : 0.9261249779271119

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

bounds' problems1

bounds' problems1

2019-11-06 07:49:02.773 INFO: Total execution time: 21ms [org.uma.jmetal.runner.multiobjective.NSGAIIRunner doAMicro]

2019-11-06 07:49:02.775 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.775 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.776 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.779 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.9394832247782086

Epsilon : 1.9394832247782086

GD (N) : 0.3043146840999816

GD : 0.3043146840999816

IGD (N) : 0.04452300982731806

IGD : 0.04452300982731806

IGD+ (N) : 1.2732304969667512

IGD+ : 1.2732304969667512

Spread (N) : 0.9857278369868095

Spread : 0.9857278369868095

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:49:02.801 INFO: Total execution time: 22ms [org.uma.jmetal.runner.multiobjective.NSGAIIRunner doAMicro]

2019-11-06 07:49:02.803 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.803 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.804 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.807 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.5640917096317475

Epsilon : 1.5640917096317475

GD (N) : 0.18715731866775595

GD : 0.18715731866775595

IGD (N) : 0.035056195669007514

IGD : 0.035056195669007514

IGD+ (N) : 0.897838893029747

IGD+ : 0.897838893029747

Spread (N) : 0.9955765147881165

Spread : 0.9955765147881165

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

bounds' problems1

2019-11-06 07:49:02.828 INFO: Total execution time: 21ms [org.uma.jmetal.runner.multiobjective.NSGAIIRunner doAMicro]

2019-11-06 07:49:02.830 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.831 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.831 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:02.834 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.3202061409752033

Epsilon : 1.3202061409752033

GD (N) : 0.10879886231844135

GD : 0.10879886231844135

IGD (N) : 0.029162940993783

IGD : 0.029162940993783

IGD+ (N) : 0.6539533243732034

IGD+ : 0.6539533243732034

Spread (N) : 0.9926239166030328

Spread : 0.9926239166030328

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:49:02.835 INFO: Total execution time: 2269ms [org.uma.jmetal.runner.multiobjective.NSGAIIRunner custNSGAIIRunner]

2019-11-06 07:49:02.843 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner printFinalSolutionSet]

2019-11-06 07:49:02.843 INFO: Objectives values have been written to file FUN.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner printFinalSolutionSet]

2019-11-06 07:49:02.843 INFO: Variables values have been written to file VAR.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner printFinalSolutionSet]

2019-11-06 07:49:02.851 INFO:

Hypervolume (N) : 0.06250000000028866

Hypervolume : 0.06250000000028866

Epsilon (N) : 0.75

Epsilon : 0.75

GD (N) : 1.7372073854031416

GD : 1.7372073854031416

IGD (N) : 0.015538882545296144

IGD : 0.015538882545296144

IGD+ (N) : 0.43549745640070864

IGD+ : 0.43549745640070864

Spread (N) : 1.176067617845023

Spread : 1.176067617845023

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

NSGAII

i = Algorithm3, j or k = Algorithm1

p(i,j):11.590239953084975

i = Algorithm3, j or k = Algorithm2

p(i,j):-119.92552979857732

i = Algorithm1, j or k = Algorithm2

p(i,j):-115.95769596601048

i = Algorithm1, j or k = Algorithm3

p(i,j):8.187990730544826

i = Algorithm2, j or k = Algorithm1

p(i,j):154.70092030533905

i = Algorithm2, j or k = Algorithm3

p(i,j):140.80467196995167

2019-11-06 07:49:59.653 INFO: Total execution time: 17ms [org.uma.jmetal.runner.multiobjective.SPEA2Runner doAMicro]

2019-11-06 07:49:59.655 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:59.656 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:59.656 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:59.657 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.2297173726348811

Epsilon : 1.2297173726348811

GD (N) : 0.0750152665736062

GD : 0.0750152665736062

IGD (N) : 0.02720872071328299

IGD : 0.02720872071328299

IGD+ (N) : 0.5634645560328815

IGD+ : 0.5634645560328815

Spread (N) : 1.0011759468227182

Spread : 1.0011759468227182

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:49:59.675 INFO: Total execution time: 17ms [org.uma.jmetal.runner.multiobjective.SPEA2Runner doAMicro]

2019-11-06 07:49:59.677 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:59.677 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:59.677 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:59.679 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.496669493398756

Epsilon : 1.496669493398756

GD (N) : 0.16870292654216829

GD : 0.16870292654216829

IGD (N) : 0.03335287145134992

IGD : 0.03335287145134992

IGD+ (N) : 0.8304166767967557

IGD+ : 0.8304166767967557

Spread (N) : 1.0067981927384198

Spread : 1.0067981927384198

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:49:59.699 INFO: Total execution time: 20ms [org.uma.jmetal.runner.multiobjective.SPEA2Runner doAMicro]

2019-11-06 07:49:59.701 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:59.701 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:59.701 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:59.703 INFO:

Hypervolume (N) : 0.1428181084171598

Hypervolume : 0.1428181084171598

Epsilon (N) : 0.36727000273060045

Epsilon : 0.36727000273060045

GD (N) : 0.04952204684638774

GD : 0.04952204684638774

IGD (N) : 0.0060051657731647785

IGD : 0.0060051657731647785

IGD+ (N) : 0.18077210817571351

IGD+ : 0.18077210817571351

Spread (N) : 0.6096652436146096

Spread : 0.6096652436146096

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:49:59.723 INFO: Total execution time: 20ms [org.uma.jmetal.runner.multiobjective.SPEA2Runner doAMicro]

2019-11-06 07:49:59.725 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:59.726 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:59.726 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:59.728 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.1958171561960134

Epsilon : 1.1958171561960134

GD (N) : 0.1569865504093493

GD : 0.1569865504093493

IGD (N) : 0.021116588459611417

IGD : 0.021116588459611417

IGD+ (N) : 0.6245687857085482

IGD+ : 0.6245687857085482

Spread (N) : 0.8854756516504565

Spread : 0.8854756516504565

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:49:59.746 INFO: Total execution time: 18ms [org.uma.jmetal.runner.multiobjective.SPEA2Runner doAMicro]

2019-11-06 07:49:59.748 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:59.748 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:59.748 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:59.750 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.2974564762980234

Epsilon : 1.2974564762980234

GD (N) : 0.15668499316637569

GD : 0.15668499316637569

IGD (N) : 0.023734098238030382

IGD : 0.023734098238030382

IGD+ (N) : 0.6848511390242776

IGD+ : 0.6848511390242776

Spread (N) : 0.9969687927078773

Spread : 0.9969687927078773

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:49:59.768 INFO: Total execution time: 18ms [org.uma.jmetal.runner.multiobjective.SPEA2Runner doAMicro]

2019-11-06 07:49:59.770 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:59.770 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:59.770 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:59.772 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.2740289612569013

Epsilon : 1.2740289612569013

GD (N) : 0.10242173464194863

GD : 0.10242173464194863

IGD (N) : 0.02814629671740359

IGD : 0.02814629671740359

IGD+ (N) : 0.607776144654902

IGD+ : 0.607776144654902

Spread (N) : 0.989341664801198

Spread : 0.989341664801198

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:49:59.794 INFO: Total execution time: 21ms [org.uma.jmetal.runner.multiobjective.SPEA2Runner doAMicro]

2019-11-06 07:49:59.796 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:59.797 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:59.797 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:59.799 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.6479159064957307

Epsilon : 1.6479159064957307

GD (N) : 0.20866654717772928

GD : 0.20866654717772928

IGD (N) : 0.0372355287193268

IGD : 0.0372355287193268

IGD+ (N) : 0.9816630898937307

IGD+ : 0.9816630898937307

Spread (N) : 0.9959051685731826

Spread : 0.9959051685731826

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:49:59.817 INFO: Total execution time: 18ms [org.uma.jmetal.runner.multiobjective.SPEA2Runner doAMicro]

2019-11-06 07:49:59.818 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:59.818 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:59.819 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:59.821 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.2902600071747208

Epsilon : 1.2902600071747208

GD (N) : 0.10722836497131291

GD : 0.10722836497131291

IGD (N) : 0.028499248250314056

IGD : 0.028499248250314056

IGD+ (N) : 0.6240071905727205

IGD+ : 0.6240071905727205

Spread (N) : 0.9904392758995951

Spread : 0.9904392758995951

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:49:59.842 INFO: Total execution time: 21ms [org.uma.jmetal.runner.multiobjective.SPEA2Runner doAMicro]

2019-11-06 07:49:59.843 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:59.844 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:59.844 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:59.845 INFO:

Hypervolume (N) : 0.05695635594040989

Hypervolume : 0.05695635594040989

Epsilon (N) : 0.8235730503454954

Epsilon : 0.8235730503454954

GD (N) : 0.07809856479226729

GD : 0.07809856479226729

IGD (N) : 0.01212719584139043

IGD : 0.01212719584139043

IGD+ (N) : 0.33990762155889565

IGD+ : 0.33990762155889565

Spread (N) : 0.7844888920954353

Spread : 0.7844888920954353

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:49:59.863 INFO: Total execution time: 18ms [org.uma.jmetal.runner.multiobjective.SPEA2Runner doAMicro]

2019-11-06 07:49:59.865 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:59.865 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:59.865 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:59.866 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.3194093788375518

Epsilon : 1.3194093788375518

GD (N) : 0.12044657789380145

GD : 0.12044657789380145

IGD (N) : 0.024960903664679977

IGD : 0.024960903664679977

IGD+ (N) : 0.6614678387999698

IGD+ : 0.6614678387999698

Spread (N) : 1.0564464228496924

Spread : 1.0564464228496924

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:49:59.888 INFO: Total execution time: 22ms [org.uma.jmetal.runner.multiobjective.SPEA2Runner doAMicro]

2019-11-06 07:49:59.890 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:59.890 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:59.890 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:59.892 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.1235794167394952

Epsilon : 1.1235794167394952

GD (N) : 0.15512661552254164

GD : 0.15512661552254164

IGD (N) : 0.02003727476195769

IGD : 0.02003727476195769

IGD+ (N) : 0.6024865344801166

IGD+ : 0.6024865344801166

Spread (N) : 0.9725649593216247

Spread : 0.9725649593216247

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:49:59.909 INFO: Total execution time: 17ms [org.uma.jmetal.runner.multiobjective.SPEA2Runner doAMicro]

2019-11-06 07:49:59.911 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:59.911 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:59.911 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:59.913 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.4889957833897651

Epsilon : 1.4889957833897651

GD (N) : 0.15855808706137048

GD : 0.15855808706137048

IGD (N) : 0.033162149603830536

IGD : 0.033162149603830536

IGD+ (N) : 0.8227429667877653

IGD+ : 0.8227429667877653

Spread (N) : 0.9956214909652089

Spread : 0.9956214909652089

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:49:59.930 INFO: Total execution time: 17ms [org.uma.jmetal.runner.multiobjective.SPEA2Runner doAMicro]

2019-11-06 07:49:59.932 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:59.933 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:59.933 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:59.934 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.588595188421381

Epsilon : 1.588595188421381

GD (N) : 0.20185193688097997

GD : 0.20185193688097997

IGD (N) : 0.035686658961038856

IGD : 0.035686658961038856

IGD+ (N) : 0.9223423718193813

IGD+ : 0.9223423718193813

Spread (N) : 1.0007753536366415

Spread : 1.0007753536366415

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:49:59.952 INFO: Total execution time: 17ms [org.uma.jmetal.runner.multiobjective.SPEA2Runner doAMicro]

2019-11-06 07:49:59.954 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:59.955 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:59.955 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:59.956 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.2859260533843686

Epsilon : 1.2859260533843686

GD (N) : 0.13458206921900673

GD : 0.13458206921900673

IGD (N) : 0.023158345580164653

IGD : 0.023158345580164653

IGD+ (N) : 0.6454788468281615

IGD+ : 0.6454788468281615

Spread (N) : 1.010647957314527

Spread : 1.010647957314527

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

bounds' problems1

2019-11-06 07:49:59.973 INFO: Total execution time: 17ms [org.uma.jmetal.runner.multiobjective.SPEA2Runner doAMicro]

2019-11-06 07:49:59.975 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:59.975 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:59.975 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:59.977 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.2358122831523313

Epsilon : 1.2358122831523313

GD (N) : 0.0799758241503791

GD : 0.0799758241503791

IGD (N) : 0.027335328110070355

IGD : 0.027335328110070355

IGD+ (N) : 0.5695594665503313

IGD+ : 0.5695594665503313

Spread (N) : 1.001108640093645

Spread : 1.001108640093645

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:49:59.995 INFO: Total execution time: 18ms [org.uma.jmetal.runner.multiobjective.SPEA2Runner doAMicro]

2019-11-06 07:49:59.996 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:59.996 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:49:59.996 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:00.000 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.2495627903602033

Epsilon : 1.2495627903602033

GD (N) : 0.09292034640876715

GD : 0.09292034640876715

IGD (N) : 0.026939594296602087

IGD : 0.026939594296602087

IGD+ (N) : 0.5833378824315759

IGD+ : 0.5833378824315759

Spread (N) : 0.9976725992114411

Spread : 0.9976725992114411

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:50:00.018 INFO: Total execution time: 18ms [org.uma.jmetal.runner.multiobjective.SPEA2Runner doAMicro]

2019-11-06 07:50:00.020 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:00.020 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:00.020 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:00.021 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.2235287389736034

Epsilon : 1.2235287389736034

GD (N) : 0.07847214722352124

GD : 0.07847214722352124

IGD (N) : 0.02585484266353215

IGD : 0.02585484266353215

IGD+ (N) : 0.5574867465129122

IGD+ : 0.5574867465129122

Spread (N) : 0.9856245982017268

Spread : 0.9856245982017268

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:50:00.039 INFO: Total execution time: 17ms [org.uma.jmetal.runner.multiobjective.SPEA2Runner doAMicro]

2019-11-06 07:50:00.041 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:00.041 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:00.041 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:00.042 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.7516196532151571

Epsilon : 1.7516196532151571

GD (N) : 0.26215379391164073

GD : 0.26215379391164073

IGD (N) : 0.039970818132114415

IGD : 0.039970818132114415

IGD+ (N) : 1.0853668433547976

IGD+ : 1.0853668433547976

Spread (N) : 1.00680523575579

Spread : 1.00680523575579

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:50:00.059 INFO: Total execution time: 17ms [org.uma.jmetal.runner.multiobjective.SPEA2Runner doAMicro]

2019-11-06 07:50:00.061 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:00.061 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:00.061 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:00.062 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.5868653371894

Epsilon : 1.5868653371894

GD (N) : 0.1901136958910027

GD : 0.1901136958910027

IGD (N) : 0.03564196389104158

IGD : 0.03564196389104158

IGD+ (N) : 0.9206125205873986

IGD+ : 0.9206125205873986

Spread (N) : 0.999682984017416

Spread : 0.999682984017416

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:50:00.080 INFO: Total execution time: 17ms [org.uma.jmetal.runner.multiobjective.SPEA2Runner doAMicro]

2019-11-06 07:50:00.082 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:00.082 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:00.082 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:00.084 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.2765724377235372

Epsilon : 1.2765724377235372

GD (N) : 0.09295531671399104

GD : 0.09295531671399104

IGD (N) : 0.028201280411960655

IGD : 0.028201280411960655

IGD+ (N) : 0.6103196211215371

IGD+ : 0.6103196211215371

Spread (N) : 1.0119484460469386

Spread : 1.0119484460469386

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:50:00.101 INFO: Total execution time: 16ms [org.uma.jmetal.runner.multiobjective.SPEA2Runner doAMicro]

2019-11-06 07:50:00.102 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:00.102 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:00.102 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:00.104 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.462575043633124

Epsilon : 1.462575043633124

GD (N) : 0.15024892127289174

GD : 0.15024892127289174

IGD (N) : 0.03251078692083463

IGD : 0.03251078692083463

IGD+ (N) : 0.7963222270311245

IGD+ : 0.7963222270311245

Spread (N) : 1.0012188384977114

Spread : 1.0012188384977114

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:50:00.122 INFO: Total execution time: 18ms [org.uma.jmetal.runner.multiobjective.SPEA2Runner doAMicro]

2019-11-06 07:50:00.124 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:00.124 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:00.124 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:00.126 INFO:

Hypervolume (N) : 0.09392070104863035

Hypervolume : 0.09392070104863035

Epsilon (N) : 0.4651270232636557

Epsilon : 0.4651270232636557

GD (N) : 0.0698071855167278

GD : 0.0698071855167278

IGD (N) : 0.007850605118587624

IGD : 0.007850605118587624

IGD+ (N) : 0.2423131623896187

IGD+ : 0.2423131623896187

Spread (N) : 0.5491830006177927

Spread : 0.5491830006177927

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

bounds' problems1

bounds' problems1

2019-11-06 07:50:00.143 INFO: Total execution time: 17ms [org.uma.jmetal.runner.multiobjective.SPEA2Runner doAMicro]

2019-11-06 07:50:00.145 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:00.145 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:00.145 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:00.146 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.2560126106720437

Epsilon : 1.2560126106720437

GD (N) : 0.08356745311407036

GD : 0.08356745311407036

IGD (N) : 0.02758458434197154

IGD : 0.02758458434197154

IGD+ (N) : 0.5897597940700439

IGD+ : 0.5897597940700439

Spread (N) : 0.9993287266872173

Spread : 0.9993287266872173

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:50:00.168 INFO: Total execution time: 22ms [org.uma.jmetal.runner.multiobjective.SPEA2Runner doAMicro]

2019-11-06 07:50:00.169 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:00.169 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:00.170 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:00.171 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.2067086928139676

Epsilon : 1.2067086928139676

GD (N) : 0.14000765285225805

GD : 0.14000765285225805

IGD (N) : 0.02109226280085037

IGD : 0.02109226280085037

IGD+ (N) : 0.601399535214961

IGD+ : 0.601399535214961

Spread (N) : 0.9215200429637466

Spread : 0.9215200429637466

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:50:00.188 INFO: Total execution time: 17ms [org.uma.jmetal.runner.multiobjective.SPEA2Runner doAMicro]

2019-11-06 07:50:00.190 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:00.191 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:00.191 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:00.193 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.304576218192106

Epsilon : 1.304576218192106

GD (N) : 0.10610517835446417

GD : 0.10610517835446417

IGD (N) : 0.028814561283587732

IGD : 0.028814561283587732

IGD+ (N) : 0.6383234015901054

IGD+ : 0.6383234015901054

Spread (N) : 1.0003165005913064

Spread : 1.0003165005913064

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:50:00.210 INFO: Total execution time: 17ms [org.uma.jmetal.runner.multiobjective.SPEA2Runner doAMicro]

2019-11-06 07:50:00.212 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:00.212 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:00.212 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:00.213 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.1199602556316264

Epsilon : 1.1199602556316264

GD (N) : 0.048317069112640894

GD : 0.048317069112640894

IGD (N) : 0.02507334475442578

IGD : 0.02507334475442578

IGD+ (N) : 0.45370743902962646

IGD+ : 0.45370743902962646

Spread (N) : 0.9905288893868769

Spread : 0.9905288893868769

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:50:00.232 INFO: Total execution time: 19ms [org.uma.jmetal.runner.multiobjective.SPEA2Runner doAMicro]

2019-11-06 07:50:00.234 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:00.234 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:00.234 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:00.234 INFO:

Hypervolume (N) : 0.022917280595901247

Hypervolume : 0.022917280595901247

Epsilon (N) : 0.8197167910611918

Epsilon : 0.8197167910611918

GD (N) : 0.12031365613568668

GD : 0.12031365613568668

IGD (N) : 0.014375743298131323

IGD : 0.014375743298131323

IGD+ (N) : 0.43958012871102936

IGD+ : 0.43958012871102936

Spread (N) : 0.8142390912605443

Spread : 0.8142390912605443

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:50:00.251 INFO: Total execution time: 16ms [org.uma.jmetal.runner.multiobjective.SPEA2Runner doAMicro]

2019-11-06 07:50:00.253 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:00.253 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:00.253 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:00.254 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.2654483192207298

Epsilon : 1.2654483192207298

GD (N) : 0.08761850638448807

GD : 0.08761850638448807

IGD (N) : 0.027961713597450255

IGD : 0.027961713597450255

IGD+ (N) : 0.5991955026187297

IGD+ : 0.5991955026187297

Spread (N) : 0.998264197424752

Spread : 0.998264197424752

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:50:00.271 INFO: Total execution time: 16ms [org.uma.jmetal.runner.multiobjective.SPEA2Runner doAMicro]

2019-11-06 07:50:00.273 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:00.273 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:00.273 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:00.275 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.3333591480778129

Epsilon : 1.3333591480778129

GD (N) : 0.10851987937035448

GD : 0.10851987937035448

IGD (N) : 0.02821721668639107

IGD : 0.02821721668639107

IGD+ (N) : 0.6671063314758132

IGD+ : 0.6671063314758132

Spread (N) : 1.0162251310120987

Spread : 1.0162251310120987

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:50:00.275 INFO: Total execution time: 5321ms [org.uma.jmetal.runner.multiobjective.SPEA2Runner custSPEA2Runner]

2019-11-06 07:50:00.279 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner printFinalSolutionSet]

2019-11-06 07:50:00.279 INFO: Objectives values have been written to file FUN.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner printFinalSolutionSet]

2019-11-06 07:50:00.279 INFO: Variables values have been written to file VAR.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner printFinalSolutionSet]

2019-11-06 07:50:00.285 INFO:

Hypervolume (N) : 0.0625000011997563

Hypervolume : 0.0625000011997563

Epsilon (N) : 0.75

Epsilon : 0.75

GD (N) : 1.7376587792302483

GD : 1.7376587792302483

IGD (N) : 0.015538882519437922

IGD : 0.015538882519437922

IGD+ (N) : 0.43549745443067056

IGD+ : 0.43549745443067056

Spread (N) : 1.1032397536394056

Spread : 1.1032397536394056

SPEA2

Error ratio : 1.0

i = Algorithm3, j or k = Algorithm1

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

p(i,j):7.382179787580441

i = Algorithm3, j or k = Algorithm2

p(i,j):-120.52341866696484

i = Algorithm1, j or k = Algorithm2

p(i,j):-109.92612009527008

i = Algorithm1, j or k = Algorithm3

p(i,j):0.610641079377146

i = Algorithm2, j or k = Algorithm1

p(i,j):139.1214884733399

i = Algorithm2, j or k = Algorithm3

p(i,j):134.6593683611485

2019-11-06 07:50:58.751 INFO: Total execution time: 18ms [org.uma.jmetal.runner.multiobjective.IBEARunner doAMicro]

2019-11-06 07:50:58.752 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:58.752 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:58.753 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:58.754 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.6111192304361475

Epsilon : 1.6111192304361475

GD (N) : 0.20038860066357161

GD : 0.20038860066357161

IGD (N) : 0.03493213889616223

IGD : 0.03493213889616223

IGD+ (N) : 0.9450909859609037

IGD+ : 0.9450909859609037

Spread (N) : 0.9944595373602901

Spread : 0.9944595373602901

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:50:58.772 INFO: Total execution time: 18ms [org.uma.jmetal.runner.multiobjective.IBEARunner doAMicro]

2019-11-06 07:50:58.773 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:58.773 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:58.773 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:58.775 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.641684118511043

Epsilon : 1.641684118511043

GD (N) : 0.2110209076129211

GD : 0.2110209076129211

IGD (N) : 0.0370713960040901

IGD : 0.0370713960040901

IGD+ (N) : 0.9754313019090433

IGD+ : 0.9754313019090433

Spread (N) : 0.9902891274298754

Spread : 0.9902891274298754

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:50:58.792 INFO: Total execution time: 17ms [org.uma.jmetal.runner.multiobjective.IBEARunner doAMicro]

2019-11-06 07:50:58.793 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:58.794 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:58.794 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:58.795 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.3192184270463996

Epsilon : 1.3192184270463996

GD (N) : 0.10435600062357868

GD : 0.10435600062357868

IGD (N) : 0.029140800698867764

IGD : 0.029140800698867764

IGD+ (N) : 0.6529656104443994

IGD+ : 0.6529656104443994

Spread (N) : 1.0147396144919145

Spread : 1.0147396144919145

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

bounds' problems1

2019-11-06 07:50:58.812 INFO: Total execution time: 17ms [org.uma.jmetal.runner.multiobjective.IBEARunner doAMicro]

2019-11-06 07:50:58.813 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:58.813 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:58.814 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:58.815 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.3415931972281472

Epsilon : 1.3415931972281472

GD (N) : 0.12207132382474921

GD : 0.12207132382474921

IGD (N) : 0.029646362452287026

IGD : 0.029646362452287026

IGD+ (N) : 0.6753403806261477

IGD+ : 0.6753403806261477

Spread (N) : 1.0030256676403448

Spread : 1.0030256676403448

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:50:58.832 INFO: Total execution time: 17ms [org.uma.jmetal.runner.multiobjective.IBEARunner doAMicro]

2019-11-06 07:50:58.834 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:58.834 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:58.834 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:58.835 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.0499525452858547

Epsilon : 1.0499525452858547

GD (N) : 0.10390134248400167

GD : 0.10390134248400167

IGD (N) : 0.016977580761578907

IGD : 0.016977580761578907

IGD+ (N) : 0.47772051946749655

IGD+ : 0.47772051946749655

Spread (N) : 0.8894654300310818

Spread : 0.8894654300310818

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:50:58.854 INFO: Total execution time: 19ms [org.uma.jmetal.runner.multiobjective.IBEARunner doAMicro]

2019-11-06 07:50:58.855 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:58.855 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:58.855 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:58.857 INFO:

Hypervolume (N) : 0.10058805426927334

Hypervolume : 0.10058805426927334

Epsilon (N) : 0.31597480344331713

Epsilon : 0.31597480344331713

GD (N) : 0.05774974185894559

GD : 0.05774974185894559

IGD (N) : 0.006015242476054577

IGD : 0.006015242476054577

IGD+ (N) : 0.1858026843388727

IGD+ : 0.1858026843388727

Spread (N) : 0.6685887850473857

Spread : 0.6685887850473857

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:50:58.874 INFO: Total execution time: 17ms [org.uma.jmetal.runner.multiobjective.IBEARunner doAMicro]

2019-11-06 07:50:58.876 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:58.876 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:58.876 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:58.878 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.3099237622467792

Epsilon : 1.3099237622467792

GD (N) : 0.10356436156452091

GD : 0.10356436156452091

IGD (N) : 0.028933276053384135

IGD : 0.028933276053384135

IGD+ (N) : 0.6436709456447792

IGD+ : 0.6436709456447792

Spread (N) : 0.9833047137498868

Spread : 0.9833047137498868

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:50:58.896 INFO: Total execution time: 18ms [org.uma.jmetal.runner.multiobjective.IBEARunner doAMicro]

2019-11-06 07:50:58.898 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:58.898 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:58.898 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:58.900 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.126866338048579

Epsilon : 1.126866338048579

GD (N) : 0.11265835882161823

GD : 0.11265835882161823

IGD (N) : 0.019058846070469298

IGD : 0.019058846070469298

IGD+ (N) : 0.5294680486552195

IGD+ : 0.5294680486552195

Spread (N) : 1.0465489803386052

Spread : 1.0465489803386052

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:50:58.918 INFO: Total execution time: 18ms [org.uma.jmetal.runner.multiobjective.IBEARunner doAMicro]

2019-11-06 07:50:58.920 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:58.920 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:58.920 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:58.922 INFO:

Hypervolume (N) : 0.06967850994057262

Hypervolume : 0.06967850994057262

Epsilon (N) : 0.7798658719266229

Epsilon : 0.7798658719266229

GD (N) : 0.07046498904337375

GD : 0.07046498904337375

IGD (N) : 0.011183555912486624

IGD : 0.011183555912486624

IGD+ (N) : 0.3078327073322792

IGD+ : 0.3078327073322792

Spread (N) : 0.8256229300196991

Spread : 0.8256229300196991

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:50:58.938 INFO: Total execution time: 16ms [org.uma.jmetal.runner.multiobjective.IBEARunner doAMicro]

2019-11-06 07:50:58.940 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:58.940 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:58.940 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:58.941 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.3455900100451543

Epsilon : 1.3455900100451543

GD (N) : 0.11672854246838585

GD : 0.11672854246838585

IGD (N) : 0.02973753855555847

IGD : 0.02973753855555847

IGD+ (N) : 0.6793371934431541

IGD+ : 0.6793371934431541

Spread (N) : 0.999996713234537

Spread : 0.999996713234537

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

bounds' problems1

bounds' problems1

bounds' problems1

2019-11-06 07:50:58.959 INFO: Total execution time: 17ms [org.uma.jmetal.runner.multiobjective.IBEARunner doAMicro]

2019-11-06 07:50:58.960 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:58.961 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:58.961 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:58.962 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.4419925720079416

Epsilon : 1.4419925720079416

GD (N) : 0.14580055681686183

GD : 0.14580055681686183

IGD (N) : 0.03200928529450667

IGD : 0.03200928529450667

IGD+ (N) : 0.7757397554059422

IGD+ : 0.7757397554059422

Spread (N) : 0.998567334257865

Spread : 0.998567334257865

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:50:58.981 INFO: Total execution time: 19ms [org.uma.jmetal.runner.multiobjective.IBEARunner doAMicro]

2019-11-06 07:50:58.983 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:58.983 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:58.983 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:58.985 INFO:

Hypervolume (N) : 4.410413077530691E-4

Hypervolume : 4.410413077530691E-4

Epsilon (N) : 0.9987615909458777

Epsilon : 0.9987615909458777

GD (N) : 0.10061248248882482

GD : 0.10061248248882482

IGD (N) : 0.016013619356383343

IGD : 0.016013619356383343

IGD+ (N) : 0.4448415857301652

IGD+ : 0.4448415857301652

Spread (N) : 0.8599190295582414

Spread : 0.8599190295582414

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:50:59.002 INFO: Total execution time: 17ms [org.uma.jmetal.runner.multiobjective.IBEARunner doAMicro]

2019-11-06 07:50:59.003 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:59.003 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:59.003 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:59.005 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.9253235994417413

Epsilon : 1.9253235994417413

GD (N) : 0.3007603271715077

GD : 0.3007603271715077

IGD (N) : 0.04481162140726814

IGD : 0.04481162140726814

IGD+ (N) : 1.2590707828397414

IGD+ : 1.2590707828397414

Spread (N) : 0.9932381405558626

Spread : 0.9932381405558626

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:50:59.022 INFO: Total execution time: 17ms [org.uma.jmetal.runner.multiobjective.IBEARunner doAMicro]

2019-11-06 07:50:59.023 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:59.023 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:59.023 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:59.024 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.261907382017338

Epsilon : 1.261907382017338

GD (N) : 0.08928368804598832

GD : 0.08928368804598832

IGD (N) : 0.027885933699950925

IGD : 0.027885933699950925

IGD+ (N) : 0.5956545654153407

IGD+ : 0.5956545654153407

Spread (N) : 0.9874109190324277

Spread : 0.9874109190324277

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:50:59.041 INFO: Total execution time: 17ms [org.uma.jmetal.runner.multiobjective.IBEARunner doAMicro]

2019-11-06 07:50:59.043 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:59.043 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:59.043 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:59.044 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.4706704881412351

Epsilon : 1.4706704881412351

GD (N) : 0.16189240470941602

GD : 0.16189240470941602

IGD (N) : 0.03270947824763259

IGD : 0.03270947824763259

IGD+ (N) : 0.8044176715392348

IGD+ : 0.8044176715392348

Spread (N) : 0.9968069703230287

Spread : 0.9968069703230287

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:50:59.062 INFO: Total execution time: 18ms [org.uma.jmetal.runner.multiobjective.IBEARunner doAMicro]

2019-11-06 07:50:59.064 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:59.064 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:59.064 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:59.065 INFO:

Hypervolume (N) : 0.010292237744928994

Hypervolume : 0.010292237744928994

Epsilon (N) : 0.9726499164741065

Epsilon : 0.9726499164741065

GD (N) : 0.08920294380492341

GD : 0.08920294380492341

IGD (N) : 0.015229746951210675

IGD : 0.015229746951210675

IGD+ (N) : 0.4105793364546465

IGD+ : 0.4105793364546465

Spread (N) : 0.79101321825979

Spread : 0.79101321825979

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

bounds' problems1

2019-11-06 07:50:59.082 INFO: Total execution time: 17ms [org.uma.jmetal.runner.multiobjective.IBEARunner doAMicro]

2019-11-06 07:50:59.084 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:59.084 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:59.084 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:59.085 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.4074091785025429

Epsilon : 1.4074091785025429

GD (N) : 0.1379381118027549

GD : 0.1379381118027549

IGD (N) : 0.031179078397761413

IGD : 0.031179078397761413

IGD+ (N) : 0.7411563619005439

IGD+ : 0.7411563619005439

Spread (N) : 0.9959264202522251

Spread : 0.9959264202522251

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:50:59.103 INFO: Total execution time: 18ms [org.uma.jmetal.runner.multiobjective.IBEARunner doAMicro]

2019-11-06 07:50:59.105 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:59.105 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:59.105 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:59.106 INFO:

Hypervolume (N) : 0.06206305707040092

Hypervolume : 0.06206305707040092

Epsilon (N) : 0.8097655317325638

Epsilon : 0.8097655317325638

GD (N) : 0.08006028366264892

GD : 0.08006028366264892

IGD (N) : 0.011953958857511302

IGD : 0.011953958857511302

IGD+ (N) : 0.33420251361027853

IGD+ : 0.33420251361027853

Spread (N) : 0.8445258623408154

Spread : 0.8445258623408154

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:50:59.123 INFO: Total execution time: 17ms [org.uma.jmetal.runner.multiobjective.IBEARunner doAMicro]

2019-11-06 07:50:59.125 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:59.125 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:59.125 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:59.126 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.5292397428632218

Epsilon : 1.5292397428632218

GD (N) : 0.17872691166564175

GD : 0.17872691166564175

IGD (N) : 0.034169703119106797

IGD : 0.034169703119106797

IGD+ (N) : 0.862986926261221

IGD+ : 0.862986926261221

Spread (N) : 0.9902470977977258

Spread : 0.9902470977977258

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:50:59.147 INFO: Total execution time: 18ms [org.uma.jmetal.runner.multiobjective.IBEARunner doAMicro]

2019-11-06 07:50:59.149 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:59.149 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:59.149 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:50:59.150 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.5378071481734055

Epsilon : 1.5378071481734055

GD (N) : 0.17693906599203413

GD : 0.17693906599203413

IGD (N) : 0.034386467248453546

IGD : 0.034386467248453546

IGD+ (N) : 0.8715543315714055

IGD+ : 0.8715543315714055

Spread (N) : 0.9945374978257555

Spread : 0.9945374978257555

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:50:59.150 INFO: Total execution time: 6786ms [org.uma.jmetal.runner.multiobjective.IBEARunner custIBEARunner]

2019-11-06 07:50:59.154 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner printFinalSolutionSet]

2019-11-06 07:50:59.154 INFO: Objectives values have been written to file FUN.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner printFinalSolutionSet]

2019-11-06 07:50:59.154 INFO: Variables values have been written to file VAR.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner printFinalSolutionSet]

2019-11-06 07:50:59.160 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 7.313661402877967

Epsilon : 7.313661402877967

GD (N) : 1.3052343491039102

GD : 1.3052343491039102

IGD (N) : 0.31211940641859715

IGD : 0.31211940641859715

IGD+ (N) : 9.874710673586241

IGD+ : 9.874710673586241

Spread (N) : 1.0123930771871028

Spread : 1.0123930771871028

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

IBEA

i = Algorithm3, j or k = Algorithm1

p(i,j):4.009689738964639

i = Algorithm3, j or k = Algorithm2

p(i,j):-99.41918058619771

i = Algorithm1, j or k = Algorithm2

p(i,j):-103.38112714143392

i = Algorithm1, j or k = Algorithm3

p(i,j):1.610534176456234

i = Algorithm2, j or k = Algorithm1

p(i,j):117.44797369934679

i = Algorithm2, j or k = Algorithm3

p(i,j):118.57301982331774

2019-11-06 07:51:49.528 INFO: Total execution time: 16ms [org.uma.jmetal.runner.multiobjective.NSGAIIRunner doAMicro]

2019-11-06 07:51:49.530 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:49.530 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:49.530 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:49.531 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.144184948249458

Epsilon : 1.144184948249458

GD (N) : 0.05477026410511952

GD : 0.05477026410511952

IGD (N) : 0.025519429840432067

IGD : 0.025519429840432067

IGD+ (N) : 0.4779321316474576

IGD+ : 0.4779321316474576

Spread (N) : 0.9858620150233993

Spread : 0.9858620150233993

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:51:49.549 INFO: Total execution time: 17ms [org.uma.jmetal.runner.multiobjective.NSGAIIRunner doAMicro]

2019-11-06 07:51:49.550 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:49.550 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:49.550 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:49.552 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.375513281028827

Epsilon : 1.375513281028827

GD (N) : 0.17673808901281957

GD : 0.17673808901281957

IGD (N) : 0.02585888035677171

IGD : 0.02585888035677171

IGD+ (N) : 0.7553900817586541

IGD+ : 0.7553900817586541

Spread (N) : 0.9848748969647669

Spread : 0.9848748969647669

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

bounds' problems1

2019-11-06 07:51:49.569 INFO: Total execution time: 17ms [org.uma.jmetal.runner.multiobjective.NSGAIIRunner doAMicro]

2019-11-06 07:51:49.571 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:49.571 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:49.571 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:49.572 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.2981106472600743

Epsilon : 1.2981106472600743

GD (N) : 0.09568011759612136

GD : 0.09568011759612136

IGD (N) : 0.028671701991894952

IGD : 0.028671701991894952

IGD+ (N) : 0.6318578306580739

IGD+ : 0.6318578306580739

Spread (N) : 0.9992077349241429

Spread : 0.9992077349241429

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:51:49.589 INFO: Total execution time: 16ms [org.uma.jmetal.runner.multiobjective.NSGAIIRunner doAMicro]

2019-11-06 07:51:49.591 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:49.591 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:49.591 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:49.593 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.5178400329447606

Epsilon : 1.5178400329447606

GD (N) : 0.16998242423254412

GD : 0.16998242423254412

IGD (N) : 0.033258898699399776

IGD : 0.033258898699399776

IGD+ (N) : 0.8515926100390697

IGD+ : 0.8515926100390697

Spread (N) : 0.9989372958329102

Spread : 0.9989372958329102

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:51:49.610 INFO: Total execution time: 17ms [org.uma.jmetal.runner.multiobjective.NSGAIIRunner doAMicro]

2019-11-06 07:51:49.611 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:49.612 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:49.612 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:49.613 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.4582008539763067

Epsilon : 1.4582008539763067

GD (N) : 0.1516203916684427

GD : 0.1516203916684427

IGD (N) : 0.03240376320883914

IGD : 0.03240376320883914

IGD+ (N) : 0.7919480373743077

IGD+ : 0.7919480373743077

Spread (N) : 1.0057046293018146

Spread : 1.0057046293018146

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:51:49.631 INFO: Total execution time: 18ms [org.uma.jmetal.runner.multiobjective.NSGAIIRunner doAMicro]

2019-11-06 07:51:49.632 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:49.632 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:49.633 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:49.634 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.328332390989472

Epsilon : 1.328332390989472

GD (N) : 0.12789644872445577

GD : 0.12789644872445577

IGD (N) : 0.025245147836455907

IGD : 0.025245147836455907

IGD+ (N) : 0.6729836323409126

IGD+ : 0.6729836323409126

Spread (N) : 0.991881284231907

Spread : 0.991881284231907

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:51:49.651 INFO: Total execution time: 17ms [org.uma.jmetal.runner.multiobjective.NSGAIIRunner doAMicro]

2019-11-06 07:51:49.652 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:49.652 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:49.653 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:49.655 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.3911628539337761

Epsilon : 1.3911628539337761

GD (N) : 0.12633041856120583

GD : 0.12633041856120583

IGD (N) : 0.028970878869572315

IGD : 0.028970878869572315

IGD+ (N) : 0.7249100373317762

IGD+ : 0.7249100373317762

Spread (N) : 1.0308487097340475

Spread : 1.0308487097340475

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:51:49.672 INFO: Total execution time: 17ms [org.uma.jmetal.runner.multiobjective.NSGAIIRunner doAMicro]

2019-11-06 07:51:49.673 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:49.673 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:49.673 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:49.674 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.7075882580436825

Epsilon : 1.7075882580436825

GD (N) : 0.2380117844094531

GD : 0.2380117844094531

IGD (N) : 0.038803920195611484

IGD : 0.038803920195611484

IGD+ (N) : 1.041335442943538

IGD+ : 1.041335442943538

Spread (N) : 0.9558346380776546

Spread : 0.9558346380776546

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:51:49.692 INFO: Total execution time: 17ms [org.uma.jmetal.runner.multiobjective.NSGAIIRunner doAMicro]

2019-11-06 07:51:49.693 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:49.693 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:49.693 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:49.694 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.241292596560036

Epsilon : 1.241292596560036

GD (N) : 0.08123961898602437

GD : 0.08123961898602437

IGD (N) : 0.027449825600215694

IGD : 0.027449825600215694

IGD+ (N) : 0.575039779958036

IGD+ : 0.575039779958036

Spread (N) : 0.9980745116943005

Spread : 0.9980745116943005

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:51:49.712 INFO: Total execution time: 17ms [org.uma.jmetal.runner.multiobjective.NSGAIIRunner doAMicro]

2019-11-06 07:51:49.714 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:49.714 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:49.714 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:49.715 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.5516108688582724

Epsilon : 1.5516108688582724

GD (N) : 0.18111428410241337

GD : 0.18111428410241337

IGD (N) : 0.03311650656678091

IGD : 0.03311650656678091

IGD+ (N) : 0.8858441682983476

IGD+ : 0.8858441682983476

Spread (N) : 0.9965984555550201

Spread : 0.9965984555550201

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:51:49.732 INFO: Total execution time: 17ms [org.uma.jmetal.runner.multiobjective.NSGAIIRunner doAMicro]

2019-11-06 07:51:49.734 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:49.734 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:49.734 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:49.736 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.230229861573607

Epsilon : 1.230229861573607

GD (N) : 0.1017328167608272

GD : 0.1017328167608272

IGD (N) : 0.02721614569265929

IGD : 0.02721614569265929

IGD+ (N) : 0.563977045037

IGD+ : 0.563977045037

Spread (N) : 0.9513357592585421

Spread : 0.9513357592585421

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:51:49.756 INFO: Total execution time: 20ms [org.uma.jmetal.runner.multiobjective.NSGAIIRunner doAMicro]

2019-11-06 07:51:49.757 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:49.758 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:49.758 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:49.759 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.375872009295226

Epsilon : 1.375872009295226

GD (N) : 0.15170941867522778

GD : 0.15170941867522778

IGD (N) : 0.025983684448596122

IGD : 0.025983684448596122

IGD+ (N) : 0.7278024110989769

IGD+ : 0.7278024110989769

Spread (N) : 0.9638436450878601

Spread : 0.9638436450878601

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:51:49.776 INFO: Total execution time: 17ms [org.uma.jmetal.runner.multiobjective.NSGAIIRunner doAMicro]

2019-11-06 07:51:49.778 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:49.778 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:49.778 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:49.779 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.5012252990364598

Epsilon : 1.5012252990364598

GD (N) : 0.1668836790035322

GD : 0.1668836790035322

IGD (N) : 0.033466419338947076

IGD : 0.033466419338947076

IGD+ (N) : 0.8349724824344602

IGD+ : 0.8349724824344602

Spread (N) : 0.9929447910728173

Spread : 0.9929447910728173

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:51:49.796 INFO: Total execution time: 17ms [org.uma.jmetal.runner.multiobjective.NSGAIIRunner doAMicro]

2019-11-06 07:51:49.798 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:49.798 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:49.798 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:49.799 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.2458390051448094

Epsilon : 1.2458390051448094

GD (N) : 0.08054301758464956

GD : 0.08054301758464956

IGD (N) : 0.027545277760401738

IGD : 0.027545277760401738

IGD+ (N) : 0.5795861885428097

IGD+ : 0.5795861885428097

Spread (N) : 0.9977666116905378

Spread : 0.9977666116905378

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:51:49.818 INFO: Total execution time: 19ms [org.uma.jmetal.runner.multiobjective.NSGAIIRunner doAMicro]

2019-11-06 07:51:49.819 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:49.820 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:49.820 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:49.822 INFO:

Hypervolume (N) : 0.04713313516504428

Hypervolume : 0.04713313516504428

Epsilon (N) : 0.6403641838469916

Epsilon : 0.6403641838469916

GD (N) : 0.08893506411075038

GD : 0.08893506411075038

IGD (N) : 0.010480831226017699

IGD : 0.010480831226017699

IGD+ (N) : 0.3178058458040621

IGD+ : 0.3178058458040621

Spread (N) : 0.8673645107887403

Spread : 0.8673645107887403

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:51:49.840 INFO: Total execution time: 18ms [org.uma.jmetal.runner.multiobjective.NSGAIIRunner doAMicro]

2019-11-06 07:51:49.841 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:49.841 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:49.841 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:49.843 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.1894700943810852

Epsilon : 1.1894700943810852

GD (N) : 0.06640527758124226

GD : 0.06640527758124226

IGD (N) : 0.026392773569852538

IGD : 0.026392773569852538

IGD+ (N) : 0.5232172777790852

IGD+ : 0.5232172777790852

Spread (N) : 0.988333523692044

Spread : 0.988333523692044

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:51:49.861 INFO: Total execution time: 18ms [org.uma.jmetal.runner.multiobjective.NSGAIIRunner doAMicro]

2019-11-06 07:51:49.862 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:49.863 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:49.863 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:49.864 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.3165597735573127

Epsilon : 1.3165597735573127

GD (N) : 0.10365076769487654

GD : 0.10365076769487654

IGD (N) : 0.028479288940548526

IGD : 0.028479288940548526

IGD+ (N) : 0.6503239671645015

IGD+ : 0.6503239671645015

Spread (N) : 1.0056830410238764

Spread : 1.0056830410238764

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:51:49.882 INFO: Total execution time: 18ms [org.uma.jmetal.runner.multiobjective.NSGAIIRunner doAMicro]

2019-11-06 07:51:49.883 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:49.884 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:49.884 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:49.885 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.3658676181758538

Epsilon : 1.3658676181758538

GD (N) : 0.18343810695492452

GD : 0.18343810695492452

IGD (N) : 0.02572054969823155

IGD : 0.02572054969823155

IGD+ (N) : 0.7463171412057888

IGD+ : 0.7463171412057888

Spread (N) : 0.9677933924618806

Spread : 0.9677933924618806

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

bounds' problems1

bounds' problems1

2019-11-06 07:51:49.903 INFO: Total execution time: 17ms [org.uma.jmetal.runner.multiobjective.NSGAIIRunner doAMicro]

2019-11-06 07:51:49.904 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:49.904 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:49.904 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:49.906 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.744762393504422

Epsilon : 1.744762393504422

GD (N) : 0.23717011928645873

GD : 0.23717011928645873

IGD (N) : 0.0398246793385502

IGD : 0.0398246793385502

IGD+ (N) : 1.0785095769024224

IGD+ : 1.0785095769024224

Spread (N) : 0.9986774767694878

Spread : 0.9986774767694878

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:51:49.923 INFO: Total execution time: 17ms [org.uma.jmetal.runner.multiobjective.NSGAIIRunner doAMicro]

2019-11-06 07:51:49.924 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:49.925 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:49.925 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:49.926 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.3057154224356282

Epsilon : 1.3057154224356282

GD (N) : 0.10267221950520304

GD : 0.10267221950520304

IGD (N) : 0.02883980931259565

IGD : 0.02883980931259565

IGD+ (N) : 0.6394626058336287

IGD+ : 0.6394626058336287

Spread (N) : 1.0080222857571606

Spread : 1.0080222857571606

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:51:49.946 INFO: Total execution time: 19ms [org.uma.jmetal.runner.multiobjective.NSGAIIRunner doAMicro]

2019-11-06 07:51:49.948 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:49.948 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:49.948 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:49.949 INFO:

Hypervolume (N) : 0.045695326169708755

Hypervolume : 0.045695326169708755

Epsilon (N) : 0.8725185945379671

Epsilon : 0.8725185945379671

GD (N) : 0.07538459544749403

GD : 0.07538459544749403

IGD (N) : 0.012921880180143801

IGD : 0.012921880180143801

IGD+ (N) : 0.34705846114694894

IGD+ : 0.34705846114694894

Spread (N) : 0.7942610564914127

Spread : 0.7942610564914127

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:51:49.969 INFO: Total execution time: 20ms [org.uma.jmetal.runner.multiobjective.NSGAIIRunner doAMicro]

2019-11-06 07:51:49.970 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:49.971 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:49.971 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:49.972 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.5470853403265692

Epsilon : 1.5470853403265692

GD (N) : 0.1835696527917519

GD : 0.1835696527917519

IGD (N) : 0.034622075498142786

IGD : 0.034622075498142786

IGD+ (N) : 0.88083252372457

IGD+ : 0.88083252372457

Spread (N) : 0.9950607292341543

Spread : 0.9950607292341543

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:51:49.991 INFO: Total execution time: 18ms [org.uma.jmetal.runner.multiobjective.NSGAIIRunner doAMicro]

2019-11-06 07:51:49.993 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:49.993 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:49.993 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:49.994 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.5161841113444288

Epsilon : 1.5161841113444288

GD (N) : 0.1703830527751696

GD : 0.1703830527751696

IGD (N) : 0.03311012071279776

IGD : 0.03311012071279776

IGD+ (N) : 0.8499659313977069

IGD+ : 0.8499659313977069

Spread (N) : 0.9913325677421002

Spread : 0.9913325677421002

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

bounds' problems1

2019-11-06 07:51:50.013 INFO: Total execution time: 18ms [org.uma.jmetal.runner.multiobjective.NSGAIIRunner doAMicro]

2019-11-06 07:51:50.015 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:50.015 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:50.015 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:50.017 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.385283077701173

Epsilon : 1.385283077701173

GD (N) : 0.12588321887527282

GD : 0.12588321887527282

IGD (N) : 0.030656589999690998

IGD : 0.030656589999690998

IGD+ (N) : 0.7190302610991722

IGD+ : 0.7190302610991722

Spread (N) : 0.9919004338844513

Spread : 0.9919004338844513

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:51:50.035 INFO: Total execution time: 18ms [org.uma.jmetal.runner.multiobjective.NSGAIIRunner doAMicro]

2019-11-06 07:51:50.037 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:50.037 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:50.037 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:51:50.039 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.5863461313034888

Epsilon : 1.5863461313034888

GD (N) : 0.20003461156649416

GD : 0.20003461156649416

IGD (N) : 0.035628554344879715

IGD : 0.035628554344879715

IGD+ (N) : 0.920093314701489

IGD+ : 0.920093314701489

Spread (N) : 0.9836561245343078

Spread : 0.9836561245343078

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:51:50.039 INFO: Total execution time: 1581ms [org.uma.jmetal.runner.multiobjective.NSGAIIRunner custNSGAIIRunner]

2019-11-06 07:51:50.041 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner printFinalSolutionSet]

2019-11-06 07:51:50.041 INFO: Objectives values have been written to file FUN.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner printFinalSolutionSet]

2019-11-06 07:51:50.041 INFO: Variables values have been written to file VAR.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner printFinalSolutionSet]

2019-11-06 07:51:50.044 INFO:

Hypervolume (N) : 0.0625

Hypervolume : 0.0625

Epsilon (N) : 0.75

Epsilon : 0.75

GD (N) : 2.3620081807010256

GD : 2.3620081807010256

IGD (N) : 0.015538882545302377

IGD : 0.015538882545302377

IGD+ (N) : 0.4354974564011828

IGD+ : 0.4354974564011828

Spread (N) : 1.0682118420797542

Spread : 1.0682118420797542

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

NSGAII

i = Algorithm3, j or k = Algorithm1

p(i,j):1.4210854715202004E-14

i = Algorithm3, j or k = Algorithm2

p(i,j):-15.440329590072835

i = Algorithm1, j or k = Algorithm2

p(i,j):-18.157052113541752

i = Algorithm1, j or k = Algorithm3

p(i,j):9.104831592411244

i = Algorithm2, j or k = Algorithm1

p(i,j):27.23018098839313

i = Algorithm2, j or k = Algorithm3

p(i,j):23.945509183621425

2019-11-06 07:52:17.858 INFO: Total execution time: 16ms [org.uma.jmetal.runner.multiobjective.SPEA2Runner doAMicro]

2019-11-06 07:52:17.860 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:17.860 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:17.860 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:17.861 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.4922025591339576

Epsilon : 1.4922025591339576

GD (N) : 0.175750147119264

GD : 0.175750147119264

IGD (N) : 0.031655184912436615

IGD : 0.031655184912436615

IGD+ (N) : 0.8264376663615275

IGD+ : 0.8264376663615275

Spread (N) : 0.9565096847664445

Spread : 0.9565096847664445

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:52:17.881 INFO: Total execution time: 20ms [org.uma.jmetal.runner.multiobjective.SPEA2Runner doAMicro]

2019-11-06 07:52:17.883 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:17.883 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:17.883 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:17.885 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.353043273003309

Epsilon : 1.353043273003309

GD (N) : 0.11630106229029832

GD : 0.11630106229029832

IGD (N) : 0.029908248159195308

IGD : 0.029908248159195308

IGD+ (N) : 0.6867904564013091

IGD+ : 0.6867904564013091

Spread (N) : 0.9972073311391099

Spread : 0.9972073311391099

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:52:17.903 INFO: Total execution time: 18ms [org.uma.jmetal.runner.multiobjective.SPEA2Runner doAMicro]

2019-11-06 07:52:17.904 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:17.904 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:17.904 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:17.905 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.3916358307005148

Epsilon : 1.3916358307005148

GD (N) : 0.13404273585034446

GD : 0.13404273585034446

IGD (N) : 0.03080588732836408

IGD : 0.03080588732836408

IGD+ (N) : 0.7253830140985141

IGD+ : 0.7253830140985141

Spread (N) : 0.9786616260684665

Spread : 0.9786616260684665

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:52:17.923 INFO: Total execution time: 17ms [org.uma.jmetal.runner.multiobjective.SPEA2Runner doAMicro]

2019-11-06 07:52:17.924 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:17.924 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:17.924 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:17.926 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.2036840025780915

Epsilon : 1.2036840025780915

GD (N) : 0.07000652097677634

GD : 0.07000652097677634

IGD (N) : 0.026676852428190085

IGD : 0.026676852428190085

IGD+ (N) : 0.5374311859760913

IGD+ : 0.5374311859760913

Spread (N) : 0.9979246361683319

Spread : 0.9979246361683319

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:52:17.942 INFO: Total execution time: 16ms [org.uma.jmetal.runner.multiobjective.SPEA2Runner doAMicro]

2019-11-06 07:52:17.944 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:17.944 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:17.944 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:17.945 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.1106541265825565

Epsilon : 1.1106541265825565

GD (N) : 0.037184304056198034

GD : 0.037184304056198034

IGD (N) : 0.024906117747664713

IGD : 0.024906117747664713

IGD+ (N) : 0.4444013099805565

IGD+ : 0.4444013099805565

Spread (N) : 0.998349311148431

Spread : 0.998349311148431

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:52:17.962 INFO: Total execution time: 16ms [org.uma.jmetal.runner.multiobjective.SPEA2Runner doAMicro]

2019-11-06 07:52:17.964 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:17.964 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:17.964 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:17.965 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.587913426910425

Epsilon : 1.587913426910425

GD (N) : 0.20172133409884735

GD : 0.20172133409884735

IGD (N) : 0.03566904060305235

IGD : 0.03566904060305235

IGD+ (N) : 0.921660610308425

IGD+ : 0.921660610308425

Spread (N) : 0.9950624959948464

Spread : 0.9950624959948464

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:52:17.985 INFO: Total execution time: 20ms [org.uma.jmetal.runner.multiobjective.SPEA2Runner doAMicro]

2019-11-06 07:52:17.987 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:17.987 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:17.987 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:17.988 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.2526031966510747

Epsilon : 1.2526031966510747

GD (N) : 0.08946189557291766

GD : 0.08946189557291766

IGD (N) : 0.02768804605528872

IGD : 0.02768804605528872

IGD+ (N) : 0.5863503800490774

IGD+ : 0.5863503800490774

Spread (N) : 0.9806803601892395

Spread : 0.9806803601892395

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:52:18.009 INFO: Total execution time: 21ms [org.uma.jmetal.runner.multiobjective.SPEA2Runner doAMicro]

2019-11-06 07:52:18.011 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:18.011 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:18.011 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:18.012 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.4087128410367153

Epsilon : 1.4087128410367153

GD (N) : 0.14221457949055968

GD : 0.14221457949055968

IGD (N) : 0.031210079539010095

IGD : 0.031210079539010095

IGD+ (N) : 0.7424600244347153

IGD+ : 0.7424600244347153

Spread (N) : 0.9816502322445827

Spread : 0.9816502322445827

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:52:18.029 INFO: Total execution time: 17ms [org.uma.jmetal.runner.multiobjective.SPEA2Runner doAMicro]

2019-11-06 07:52:18.031 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:18.031 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:18.031 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:18.032 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.3328083078321105

Epsilon : 1.3328083078321105

GD (N) : 0.11844619353596667

GD : 0.11844619353596667

IGD (N) : 0.026938747518504755

IGD : 0.026938747518504755

IGD+ (N) : 0.6683687098045763

IGD+ : 0.6683687098045763

Spread (N) : 0.980942785468897

Spread : 0.980942785468897

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:52:18.051 INFO: Total execution time: 18ms [org.uma.jmetal.runner.multiobjective.SPEA2Runner doAMicro]

2019-11-06 07:52:18.052 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:18.053 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:18.053 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:18.054 INFO:

Hypervolume (N) : 0.013064663357053335

Hypervolume : 0.013064663357053335

Epsilon (N) : 0.9090960409096595

Epsilon : 0.9090960409096595

GD (N) : 0.13089756360418994

GD : 0.13089756360418994

IGD (N) : 0.015578985325036711

IGD : 0.015578985325036711

IGD+ (N) : 0.4716867925647394

IGD+ : 0.4716867925647394

Spread (N) : 0.920476529891022

Spread : 0.920476529891022

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:52:18.072 INFO: Total execution time: 18ms [org.uma.jmetal.runner.multiobjective.SPEA2Runner doAMicro]

2019-11-06 07:52:18.074 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:18.074 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:18.074 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:18.076 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.6587281068799669

Epsilon : 1.6587281068799669

GD (N) : 0.22171851661963654

GD : 0.22171851661963654

IGD (N) : 0.03752105247402242

IGD : 0.03752105247402242

IGD+ (N) : 0.9924752902779662

IGD+ : 0.9924752902779662

Spread (N) : 0.994280710766976

Spread : 0.994280710766976

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

bounds' problems1

2019-11-06 07:52:18.096 INFO: Total execution time: 20ms [org.uma.jmetal.runner.multiobjective.SPEA2Runner doAMicro]

2019-11-06 07:52:18.098 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:18.098 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:18.098 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:18.099 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.3681258290260003

Epsilon : 1.3681258290260003

GD (N) : 0.12572510351834298

GD : 0.12572510351834298

IGD (N) : 0.030256349774381

IGD : 0.030256349774381

IGD+ (N) : 0.7018730124240016

IGD+ : 0.7018730124240016

Spread (N) : 0.9894557154594362

Spread : 0.9894557154594362

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:52:18.118 INFO: Total execution time: 18ms [org.uma.jmetal.runner.multiobjective.SPEA2Runner doAMicro]

2019-11-06 07:52:18.119 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:18.119 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:18.120 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:18.121 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.180059914301652

Epsilon : 1.180059914301652

GD (N) : 0.06513013609468875

GD : 0.06513013609468875

IGD (N) : 0.024239233116361635

IGD : 0.024239233116361635

IGD+ (N) : 0.5141368754836102

IGD+ : 0.5141368754836102

Spread (N) : 0.9932407386281504

Spread : 0.9932407386281504

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

bounds' problems1

2019-11-06 07:52:18.138 INFO: Total execution time: 17ms [org.uma.jmetal.runner.multiobjective.SPEA2Runner doAMicro]

2019-11-06 07:52:18.139 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:18.139 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:18.140 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:18.141 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.176576535663022

Epsilon : 1.176576535663022

GD (N) : 0.056833646091808354

GD : 0.056833646091808354

IGD (N) : 0.026139098591657237

IGD : 0.026139098591657237

IGD+ (N) : 0.5103237190610223

IGD+ : 0.5103237190610223

Spread (N) : 0.9988373109497902

Spread : 0.9988373109497902

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:52:18.158 INFO: Total execution time: 17ms [org.uma.jmetal.runner.multiobjective.SPEA2Runner doAMicro]

2019-11-06 07:52:18.160 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:18.160 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:18.160 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:18.161 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.7220948817282085

Epsilon : 1.7220948817282085

GD (N) : 0.23910910516887585

GD : 0.23910910516887585

IGD (N) : 0.03921255721625478

IGD : 0.03921255721625478

IGD+ (N) : 1.0558420651262084

IGD+ : 1.0558420651262084

Spread (N) : 0.9834165158111875

Spread : 0.9834165158111875

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:52:18.179 INFO: Total execution time: 17ms [org.uma.jmetal.runner.multiobjective.SPEA2Runner doAMicro]

2019-11-06 07:52:18.180 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:18.180 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:18.180 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:18.181 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.3380850356388503

Epsilon : 1.3380850356388503

GD (N) : 0.11296441081196791

GD : 0.11296441081196791

IGD (N) : 0.0295665471011425

IGD : 0.0295665471011425

IGD+ (N) : 0.6718322190368504

IGD+ : 0.6718322190368504

Spread (N) : 0.9972840170398372

Spread : 0.9972840170398372

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:52:18.199 INFO: Total execution time: 18ms [org.uma.jmetal.runner.multiobjective.SPEA2Runner doAMicro]

2019-11-06 07:52:18.200 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:18.201 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:18.201 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:18.202 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.4151620780993472

Epsilon : 1.4151620780993472

GD (N) : 0.16284276982032744

GD : 0.16284276982032744

IGD (N) : 0.02752972364998634

IGD : 0.02752972364998634

IGD+ (N) : 0.7624905722638383

IGD+ : 0.7624905722638383

Spread (N) : 0.9970100431770099

Spread : 0.9970100431770099

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:52:18.219 INFO: Total execution time: 17ms [org.uma.jmetal.runner.multiobjective.SPEA2Runner doAMicro]

2019-11-06 07:52:18.220 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:18.221 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:18.221 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:18.222 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.4571755227187055

Epsilon : 1.4571755227187055

GD (N) : 0.16379509327043548

GD : 0.16379509327043548

IGD (N) : 0.02875346301531152

IGD : 0.02875346301531152

IGD+ (N) : 0.7990930458265095

IGD+ : 0.7990930458265095

Spread (N) : 1.0399372718922952

Spread : 1.0399372718922952

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:52:18.239 INFO: Total execution time: 17ms [org.uma.jmetal.runner.multiobjective.SPEA2Runner doAMicro]

2019-11-06 07:52:18.241 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:18.241 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:18.241 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:18.243 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.3248357977822338

Epsilon : 1.3248357977822338

GD (N) : 0.10905776361566395

GD : 0.10905776361566395

IGD (N) : 0.02926693902745983

IGD : 0.02926693902745983

IGD+ (N) : 0.6585829811802335

IGD+ : 0.6585829811802335

Spread (N) : 0.9986407904956159

Spread : 0.9986407904956159

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:52:18.259 INFO: Total execution time: 16ms [org.uma.jmetal.runner.multiobjective.SPEA2Runner doAMicro]

2019-11-06 07:52:18.261 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:18.261 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:18.261 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:18.262 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.399943674743

Epsilon : 1.399943674743

GD (N) : 0.1305954265991574

GD : 0.1305954265991574

IGD (N) : 0.03100200722965822

IGD : 0.03100200722965822

IGD+ (N) : 0.7336908581409991

IGD+ : 0.7336908581409991

Spread (N) : 1.002680480997602

Spread : 1.002680480997602

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:52:18.280 INFO: Total execution time: 18ms [org.uma.jmetal.runner.multiobjective.SPEA2Runner doAMicro]

2019-11-06 07:52:18.281 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:18.281 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:18.282 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:18.283 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.4192504792552123

Epsilon : 1.4192504792552123

GD (N) : 0.1384248287535831

GD : 0.1384248287535831

IGD (N) : 0.030623019955115988

IGD : 0.030623019955115988

IGD+ (N) : 0.7529976626532111

IGD+ : 0.7529976626532111

Spread (N) : 1.0045066052259155

Spread : 1.0045066052259155

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:52:18.301 INFO: Total execution time: 18ms [org.uma.jmetal.runner.multiobjective.SPEA2Runner doAMicro]

2019-11-06 07:52:18.303 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:18.303 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:18.304 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:18.305 INFO:

Hypervolume (N) : 0.0015077913506151243

Hypervolume : 0.0015077913506151243

Epsilon (N) : 0.9066680089735658

Epsilon : 0.9066680089735658

GD (N) : 0.15970335968561425

GD : 0.15970335968561425

IGD (N) : 0.01766215560794066

IGD : 0.01766215560794066

IGD+ (N) : 0.5484736257950479

IGD+ : 0.5484736257950479

Spread (N) : 0.8164845728732073

Spread : 0.8164845728732073

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:52:18.327 INFO: Total execution time: 22ms [org.uma.jmetal.runner.multiobjective.SPEA2Runner doAMicro]

2019-11-06 07:52:18.328 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:18.329 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:18.329 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:18.330 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.425466801174127

Epsilon : 1.425466801174127

GD (N) : 0.1714104641716124

GD : 0.1714104641716124

IGD (N) : 0.027737089012832096

IGD : 0.027737089012832096

IGD+ (N) : 0.7735196664908219

IGD+ : 0.7735196664908219

Spread (N) : 1.0327258986106405

Spread : 1.0327258986106405

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:52:18.348 INFO: Total execution time: 17ms [org.uma.jmetal.runner.multiobjective.SPEA2Runner doAMicro]

2019-11-06 07:52:18.350 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:18.351 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:18.351 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:18.352 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.4749853894378226

Epsilon : 1.4749853894378226

GD (N) : 0.16302757302932086

GD : 0.16302757302932086

IGD (N) : 0.0328157030004327

IGD : 0.0328157030004327

IGD+ (N) : 0.8087325728358241

IGD+ : 0.8087325728358241

Spread (N) : 0.9874064196115326

Spread : 0.9874064196115326

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:52:18.352 INFO: Total execution time: 1538ms [org.uma.jmetal.runner.multiobjective.SPEA2Runner custSPEA2Runner]

2019-11-06 07:52:18.354 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner printFinalSolutionSet]

2019-11-06 07:52:18.354 INFO: Objectives values have been written to file FUN.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner printFinalSolutionSet]

2019-11-06 07:52:18.354 INFO: Variables values have been written to file VAR.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner printFinalSolutionSet]

2019-11-06 07:52:18.357 INFO:

Hypervolume (N) : 0.06250000002592948

Hypervolume : 0.06250000002592948

Epsilon (N) : 0.75

Epsilon : 0.75

GD (N) : 2.449285670105776

GD : 2.449285670105776

IGD (N) : 0.015538882544743381

IGD : 0.015538882544743381

IGD+ (N) : 0.4354974563585954

IGD+ : 0.4354974563585954

Spread (N) : 0.9248459990502157

Spread : 0.9248459990502157

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

SPEA2

i = Algorithm3, j or k = Algorithm1

p(i,j):3.303419147129958

i = Algorithm3, j or k = Algorithm2

p(i,j):-17.796439280695907

i = Algorithm1, j or k = Algorithm2

p(i,j):-14.802130415043564

i = Algorithm1, j or k = Algorithm3

p(i,j):2.751889131100171

i = Algorithm2, j or k = Algorithm1

p(i,j):22.69846322598913

i = Algorithm2, j or k = Algorithm3

p(i,j):23.721759481847457

2019-11-06 07:52:48.093 INFO: Total execution time: 17ms [org.uma.jmetal.runner.multiobjective.IBEARunner doAMicro]

2019-11-06 07:52:48.094 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:48.094 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:48.094 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:48.095 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.2939978850172769

Epsilon : 1.2939978850172769

GD (N) : 0.09703122836664548

GD : 0.09703122836664548

IGD (N) : 0.028581218446172042

IGD : 0.028581218446172042

IGD+ (N) : 0.6277450684152769

IGD+ : 0.6277450684152769

Spread (N) : 0.9975292376826532

Spread : 0.9975292376826532

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:52:48.113 INFO: Total execution time: 17ms [org.uma.jmetal.runner.multiobjective.IBEARunner doAMicro]

2019-11-06 07:52:48.114 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:48.114 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:48.114 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:48.116 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.5447154341995537

Epsilon : 1.5447154341995537

GD (N) : 0.17515053667398323

GD : 0.17515053667398323

IGD (N) : 0.03456181053510427

IGD : 0.03456181053510427

IGD+ (N) : 0.8784626175975542

IGD+ : 0.8784626175975542

Spread (N) : 1.0003929984196618

Spread : 1.0003929984196618

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:52:48.133 INFO: Total execution time: 17ms [org.uma.jmetal.runner.multiobjective.IBEARunner doAMicro]

2019-11-06 07:52:48.134 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:48.134 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:48.134 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:48.136 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.274797409233245

Epsilon : 1.274797409233245

GD (N) : 0.09704443891779888

GD : 0.09704443891779888

IGD (N) : 0.028162895770288607

IGD : 0.028162895770288607

IGD+ (N) : 0.6085445926312455

IGD+ : 0.6085445926312455

Spread (N) : 0.9716770400544357

Spread : 0.9716770400544357

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:52:48.154 INFO: Total execution time: 18ms [org.uma.jmetal.runner.multiobjective.IBEARunner doAMicro]

2019-11-06 07:52:48.155 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:48.156 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:48.156 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:48.157 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.8290861575197526

Epsilon : 1.8290861575197526

GD (N) : 0.2681764228900506

GD : 0.2681764228900506

IGD (N) : 0.042130791064232634

IGD : 0.042130791064232634

IGD+ (N) : 1.1628333409177534

IGD+ : 1.1628333409177534

Spread (N) : 0.9965783030261678

Spread : 0.9965783030261678

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:52:48.177 INFO: Total execution time: 19ms [org.uma.jmetal.runner.multiobjective.IBEARunner doAMicro]

2019-11-06 07:52:48.178 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:48.178 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:48.179 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:48.180 INFO:

Hypervolume (N) : 0.010374375447754623

Hypervolume : 0.010374375447754623

Epsilon (N) : 0.8975164202215407

Epsilon : 0.8975164202215407

GD (N) : 0.1473064319731898

GD : 0.1473064319731898

IGD (N) : 0.016302131914807696

IGD : 0.016302131914807696

IGD+ (N) : 0.501507614236507

IGD+ : 0.501507614236507

Spread (N) : 0.7731366989928254

Spread : 0.7731366989928254

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:52:48.197 INFO: Total execution time: 17ms [org.uma.jmetal.runner.multiobjective.IBEARunner doAMicro]

2019-11-06 07:52:48.199 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:48.199 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:48.199 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:48.200 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.4036486620932438

Epsilon : 1.4036486620932438

GD (N) : 0.13508219680076644

GD : 0.13508219680076644

IGD (N) : 0.030245626689632155

IGD : 0.030245626689632155

IGD+ (N) : 0.7373958454912436

IGD+ : 0.7373958454912436

Spread (N) : 1.0095410781592469

Spread : 1.0095410781592469

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:52:48.218 INFO: Total execution time: 17ms [org.uma.jmetal.runner.multiobjective.IBEARunner doAMicro]

2019-11-06 07:52:48.219 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:48.219 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:48.219 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:48.220 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.2877173715130923

Epsilon : 1.2877173715130923

GD (N) : 0.0966794222361325

GD : 0.0966794222361325

IGD (N) : 0.028443634963871634

IGD : 0.028443634963871634

IGD+ (N) : 0.6214645549110919

IGD+ : 0.6214645549110919

Spread (N) : 0.9973392346838715

Spread : 0.9973392346838715

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:52:48.238 INFO: Total execution time: 17ms [org.uma.jmetal.runner.multiobjective.IBEARunner doAMicro]

2019-11-06 07:52:48.239 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:48.239 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:48.239 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:48.240 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.4711226015239887

Epsilon : 1.4711226015239887

GD (N) : 0.15947533038147102

GD : 0.15947533038147102

IGD (N) : 0.0325118974788777

IGD : 0.0325118974788777

IGD+ (N) : 0.8048702651642929

IGD+ : 0.8048702651642929

Spread (N) : 1.0019131978879794

Spread : 1.0019131978879794

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:52:48.258 INFO: Total execution time: 18ms [org.uma.jmetal.runner.multiobjective.IBEARunner doAMicro]

2019-11-06 07:52:48.259 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:48.259 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:48.259 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:48.260 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.3346706054063846

Epsilon : 1.3346706054063846

GD (N) : 0.1250824621018073

GD : 0.1250824621018073

IGD (N) : 0.026433837221162885

IGD : 0.026433837221162885

IGD+ (N) : 0.6722508086363544

IGD+ : 0.6722508086363544

Spread (N) : 1.0469888892074763

Spread : 1.0469888892074763

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:52:48.277 INFO: Total execution time: 17ms [org.uma.jmetal.runner.multiobjective.IBEARunner doAMicro]

2019-11-06 07:52:48.279 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:48.279 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:48.279 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:48.280 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.3715842191517684

Epsilon : 1.3715842191517684

GD (N) : 0.1284495922902269

GD : 0.1284495922902269

IGD (N) : 0.030324808562896977

IGD : 0.030324808562896977

IGD+ (N) : 0.7053314032477577

IGD+ : 0.7053314032477577

Spread (N) : 1.0003706419313094

Spread : 1.0003706419313094

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:52:48.297 INFO: Total execution time: 17ms [org.uma.jmetal.runner.multiobjective.IBEARunner doAMicro]

2019-11-06 07:52:48.299 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:48.299 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:48.299 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:48.300 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.575908459839045

Epsilon : 1.575908459839045

GD (N) : 0.18859860824329072

GD : 0.18859860824329072

IGD (N) : 0.03535951337007117

IGD : 0.03535951337007117

IGD+ (N) : 0.9096556432370466

IGD+ : 0.9096556432370466

Spread (N) : 0.9973926335022005

Spread : 0.9973926335022005

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:52:48.318 INFO: Total execution time: 18ms [org.uma.jmetal.runner.multiobjective.IBEARunner doAMicro]

2019-11-06 07:52:48.319 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:48.319 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:48.319 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:48.320 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.1816765788551473

Epsilon : 1.1816765788551473

GD (N) : 0.06502734850109035

GD : 0.06502734850109035

IGD (N) : 0.026237140710554982

IGD : 0.026237140710554982

IGD+ (N) : 0.5154237622786042

IGD+ : 0.5154237622786042

Spread (N) : 0.9943143104535691

Spread : 0.9943143104535691

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

bounds' problems1

bounds' problems1

2019-11-06 07:52:48.337 INFO: Total execution time: 16ms [org.uma.jmetal.runner.multiobjective.IBEARunner doAMicro]

2019-11-06 07:52:48.339 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:48.339 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:48.339 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:48.340 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.7703824152674048

Epsilon : 1.7703824152674048

GD (N) : 0.25624016101726765

GD : 0.25624016101726765

IGD (N) : 0.03842489894434832

IGD : 0.03842489894434832

IGD+ (N) : 1.1060079428228007

IGD+ : 1.1060079428228007

Spread (N) : 0.9879593070109782

Spread : 0.9879593070109782

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:52:48.356 INFO: Total execution time: 16ms [org.uma.jmetal.runner.multiobjective.IBEARunner doAMicro]

2019-11-06 07:52:48.358 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:48.358 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:48.358 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:48.360 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.4110614678153248

Epsilon : 1.4110614678153248

GD (N) : 0.1358645646501717

GD : 0.1358645646501717

IGD (N) : 0.031265989571262566

IGD : 0.031265989571262566

IGD+ (N) : 0.7448086512133244

IGD+ : 0.7448086512133244

Spread (N) : 0.9981898897222585

Spread : 0.9981898897222585

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:52:48.377 INFO: Total execution time: 17ms [org.uma.jmetal.runner.multiobjective.IBEARunner doAMicro]

2019-11-06 07:52:48.379 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:48.379 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:48.379 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:48.380 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.393416819159827

Epsilon : 1.393416819159827

GD (N) : 0.13965906206925577

GD : 0.13965906206925577

IGD (N) : 0.030847846983999637

IGD : 0.030847846983999637

IGD+ (N) : 0.7271640025578268

IGD+ : 0.7271640025578268

Spread (N) : 1.0004782093543834

Spread : 1.0004782093543834

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:52:48.396 INFO: Total execution time: 16ms [org.uma.jmetal.runner.multiobjective.IBEARunner doAMicro]

2019-11-06 07:52:48.398 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:48.398 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:48.398 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:48.399 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.1691623909560733

Epsilon : 1.1691623909560733

GD (N) : 0.05736999448202336

GD : 0.05736999448202336

IGD (N) : 0.025100770571726952

IGD : 0.025100770571726952

IGD+ (N) : 0.5029908206678658

IGD+ : 0.5029908206678658

Spread (N) : 0.9892834396119404

Spread : 0.9892834396119404

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:52:48.418 INFO: Total execution time: 19ms [org.uma.jmetal.runner.multiobjective.IBEARunner doAMicro]

2019-11-06 07:52:48.420 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:48.420 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:48.420 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:48.421 INFO:

Hypervolume (N) : 0.012936441472883373

Hypervolume : 0.012936441472883373

Epsilon (N) : 0.8485956363350259

Epsilon : 0.8485956363350259

GD (N) : 0.14432977886192344

GD : 0.14432977886192344

IGD (N) : 0.016101721430284672

IGD : 0.016101721430284672

IGD+ (N) : 0.49810619190804617

IGD+ : 0.49810619190804617

Spread (N) : 0.7767717457286271

Spread : 0.7767717457286271

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:52:48.438 INFO: Total execution time: 17ms [org.uma.jmetal.runner.multiobjective.IBEARunner doAMicro]

2019-11-06 07:52:48.440 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:48.440 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:48.440 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:48.441 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.148178637587073

Epsilon : 1.148178637587073

GD (N) : 0.07081056438729189

GD : 0.07081056438729189

IGD (N) : 0.020476189389042894

IGD : 0.020476189389042894

IGD+ (N) : 0.4948467236157195

IGD+ : 0.4948467236157195

Spread (N) : 1.0142066422096012

Spread : 1.0142066422096012

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:52:48.460 INFO: Total execution time: 19ms [org.uma.jmetal.runner.multiobjective.IBEARunner doAMicro]

2019-11-06 07:52:48.462 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:48.462 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:48.462 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:48.463 INFO:

Hypervolume (N) : 0.05745413141287131

Hypervolume : 0.05745413141287131

Epsilon (N) : 0.5842931101260269

Epsilon : 0.5842931101260269

GD (N) : 0.0930680532816707

GD : 0.0930680532816707

IGD (N) : 0.009943644804996219

IGD : 0.009943644804996219

IGD+ (N) : 0.3030058882508641

IGD+ : 0.3030058882508641

Spread (N) : 0.7542151397000673

Spread : 0.7542151397000673

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:52:48.481 INFO: Total execution time: 18ms [org.uma.jmetal.runner.multiobjective.IBEARunner doAMicro]

2019-11-06 07:52:48.482 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:48.482 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:48.482 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:48.483 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.3073960930518043

Epsilon : 1.3073960930518043

GD (N) : 0.11364639140654118

GD : 0.11364639140654118

IGD (N) : 0.028877099540614605

IGD : 0.028877099540614605

IGD+ (N) : 0.6411432764498042

IGD+ : 0.6411432764498042

Spread (N) : 1.0020349399951438

Spread : 1.0020349399951438

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:52:48.502 INFO: Total execution time: 19ms [org.uma.jmetal.runner.multiobjective.IBEARunner doAMicro]

2019-11-06 07:52:48.504 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:48.504 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:48.504 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:48.505 INFO:

Hypervolume (N) : 0.025431223125350202

Hypervolume : 0.025431223125350202

Epsilon (N) : 0.8469818887529107

Epsilon : 0.8469818887529107

GD (N) : 0.11004123813093006

GD : 0.11004123813093006

IGD (N) : 0.013752125373149512

IGD : 0.013752125373149512

IGD+ (N) : 0.41158000437645464

IGD+ : 0.41158000437645464

Spread (N) : 0.7330523244189481

Spread : 0.7330523244189481

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:52:48.523 INFO: Total execution time: 18ms [org.uma.jmetal.runner.multiobjective.IBEARunner doAMicro]

2019-11-06 07:52:48.524 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:48.524 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:48.524 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:48.525 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.0950203683455184

Epsilon : 1.0950203683455184

GD (N) : 0.03413231628139288

GD : 0.03413231628139288

IGD (N) : 0.02463054588016836

IGD : 0.02463054588016836

IGD+ (N) : 0.42876755174351844

IGD+ : 0.42876755174351844

Spread (N) : 0.9877850068679755

Spread : 0.9877850068679755

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:52:48.542 INFO: Total execution time: 17ms [org.uma.jmetal.runner.multiobjective.IBEARunner doAMicro]

2019-11-06 07:52:48.544 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:48.544 INFO: Objectives values have been written to file FUN\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:48.544 INFO: Variables values have been written to file VAR\_ZDT210\_250.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner CustmizedPrintFinalSolutionSet]

2019-11-06 07:52:48.545 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 1.0782803702484496

Epsilon : 1.0782803702484496

GD (N) : 0.13131867256621693

GD : 0.13131867256621693

IGD (N) : 0.01810955672943262

IGD : 0.01810955672943262

IGD+ (N) : 0.5159049994079152

IGD+ : 0.5159049994079152

Spread (N) : 0.8824410080778022

Spread : 0.8824410080778022

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

2019-11-06 07:52:48.545 INFO: Total execution time: 3523ms [org.uma.jmetal.runner.multiobjective.IBEARunner custIBEARunner]

2019-11-06 07:52:48.547 INFO: Random seed: 1572988739690 [org.uma.jmetal.util.AbstractAlgorithmRunner printFinalSolutionSet]

2019-11-06 07:52:48.547 INFO: Objectives values have been written to file FUN.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner printFinalSolutionSet]

2019-11-06 07:52:48.547 INFO: Variables values have been written to file VAR.tsv [org.uma.jmetal.util.AbstractAlgorithmRunner printFinalSolutionSet]

2019-11-06 07:52:48.550 INFO:

Hypervolume (N) : 0.0

Hypervolume : 0.0

Epsilon (N) : 7.3624998641621175

Epsilon : 7.3624998641621175

GD (N) : 1.8323957602728158

GD : 1.8323957602728158

IGD (N) : 0.3121212436023277

IGD : 0.3121212436023277

IGD+ (N) : 9.874797115757032

IGD+ : 9.874797115757032

Spread (N) : 0.7830934099550565

Spread : 0.7830934099550565

Error ratio : 1.0

[org.uma.jmetal.util.AbstractAlgorithmRunner printQualityIndicators]

IBEA

i = Algorithm3, j or k = Algorithm1

p(i,j):0.013691158423796423

i = Algorithm3, j or k = Algorithm2

p(i,j):-9.065050538233805

i = Algorithm1, j or k = Algorithm2

p(i,j):-10.655406147832366

i = Algorithm1, j or k = Algorithm3

p(i,j):0.02827014632416791

i = Algorithm2, j or k = Algorithm1

p(i,j):16.65062439745224

i = Algorithm2, j or k = Algorithm3

p(i,j):16.27080867929422

Process finished with exit code 0