

**UNIVERSIDADE FEDERAL DA FRONTEIRA SUL
CAMPUS CHAPECÓ
CURSO DE CIÊNCIA DA COMPUTAÇÃO**

IMPLEMENTAÇÃO DA VIZINHANÇA NODE SWAP

Yuri Luis Malinski Lanzini

Discussão:

A vizinhança node swap foi implementada como uma alternativa para complementar os operadores já existentes no algoritmo de busca local, como o 2-opt e o shift. Nos testes realizados, a nova vizinhança apresentou um comportamento interessante, mas com limitações em relação à qualidade das soluções encontradas.

Em geral, o node swap gerou soluções com valores de qualidade (q-medio) significativamente mais altos que os obtidos pelo 2-opt e shift, indicando que a troca de nós não conseguiu otimizar as rotas de forma tão eficaz. Isso sugere que o node swap enfrentou dificuldades em encontrar soluções próximas do ótimo, apresentando desvios consideráveis em relação às melhores soluções encontradas.

Por outro lado, o node swap se destacou em termos de tempo de execução, sendo comparável aos outros métodos. Apesar de não ter oferecido soluções tão boas, a simplicidade da operação de troca de nós contribuiu para um tempo de execução competitivo, especialmente em instâncias menores.

De maneira geral, a vizinhança node swap mostrou-se válida para explorar soluções alternativas, mas com limitações em alcançar ótimos locais de qualidade comparável a outras abordagens, como o 2-opt. Ela pode ser útil como um complemento na busca por diversidade de soluções, embora não tenha se mostrado tão eficaz isoladamente para otimização em instâncias mais complexas.

Segue nas páginas abaixo as tabelas:

| Instância | autoria | algoritmo | q-medio | q-desvio | t-medio | % do ótimo |
|---------------------|-------------|---------------|---------|----------|---------|------------|
| Instância: Djibouti | | | | | | |
| Djibouti | YuriLanzini | BLMM2opt | 7166.0 | 0.0 | 0.0 | 107.66 |
| Djibouti | YuriLanzini | BLMM2opt | 6656.0 | 0.0 | 0.0 | 100.0 |
| Djibouti | YuriLanzini | BLMM2opt | 6657.0 | 0.0 | 0.0 | 100.02 |
| Djibouti | YuriLanzini | BLMM2opt | 6995.0 | 0.0 | 0.0 | 105.09 |
| Djibouti | YuriLanzini | BLMM2opt | 6657.0 | 0.0 | 0.0 | 100.02 |
| Djibouti | YuriLanzini | BLMM2opt | 6656.0 | 0.0 | 0.0 | 100.0 |
| Djibouti | YuriLanzini | BLMM2opt | 6707.0 | 0.0 | 0.0 | 100.77 |
| Djibouti | YuriLanzini | BLMM2opt | 6808.0 | 0.0 | 0.0 | 102.28 |
| Djibouti | YuriLanzini | BLMM2opt | 6995.0 | 0.0 | 0.0 | 105.09 |
| Djibouti | YuriLanzini | BLMM2opt | 6656.0 | 0.0 | 0.0 | 100.0 |
| Djibouti | YuriLanzini | BLMMnode-swap | 9832.0 | 0.0 | 0.01 | 147.72 |
| Djibouti | YuriLanzini | BLMMnode-swap | 9357.0 | 0.0 | 0.01 | 140.58 |
| Djibouti | YuriLanzini | BLMMnode-swap | 9649.0 | 0.0 | 0.0 | 144.97 |
| Djibouti | YuriLanzini | BLMMnode-swap | 9355.0 | 0.0 | 0.0 | 140.55 |
| Djibouti | YuriLanzini | BLMMnode-swap | 12450.0 | 0.0 | 0.0 | 187.05 |
| Djibouti | YuriLanzini | BLMMnode-swap | 10453.0 | 0.0 | 0.0 | 157.05 |
| Djibouti | YuriLanzini | BLMMnode-swap | 10802.0 | 0.0 | 0.0 | 162.29 |
| Djibouti | YuriLanzini | BLMMnode-swap | 10727.7 | 18.02 | 0.01 | 161.17 |
| Djibouti | YuriLanzini | BLMMnode-swap | 8929.0 | 0.0 | 0.0 | 134.15 |
| Djibouti | YuriLanzini | BLMMnode-swap | 9923.0 | 0.0 | 0.0 | 149.08 |
| Djibouti | YuriLanzini | BLMMsh | 8798.0 | 0.0 | 0.01 | 132.18 |
| Djibouti | YuriLanzini | BLMMsh | 8600.8 | 151.16 | 0.01 | 129.22 |
| Djibouti | YuriLanzini | BLMMsh | 9663.3 | 55.46 | 0.01 | 145.18 |
| Djibouti | YuriLanzini | BLMMsh | 8655.0 | 0.0 | 0.01 | 130.03 |
| Djibouti | YuriLanzini | BLMMsh | 8827.8 | 2.53 | 0.01 | 132.63 |
| Djibouti | YuriLanzini | BLMMsh | 8045.0 | 0.0 | 0.0 | 120.87 |
| Djibouti | YuriLanzini | BLMMsh | 7869.0 | 0.0 | 0.01 | 118.22 |
| Djibouti | YuriLanzini | BLMMsh | 8219.0 | 0.0 | 0.01 | 123.48 |
| Djibouti | YuriLanzini | BLMMsh | 8890.0 | 0.0 | 0.01 | 133.56 |
| Djibouti | YuriLanzini | BLMMsh | 7495.0 | 0.0 | 0.01 | 112.61 |
| Djibouti | YuriLanzini | BLPM2opt | 6808.0 | 0.0 | 0.0 | 102.28 |
| Djibouti | YuriLanzini | BLPM2opt | 7231.0 | 0.0 | 0.0 | 108.64 |
| Djibouti | YuriLanzini | BLPM2opt | 7156.0 | 0.0 | 0.0 | 107.51 |
| Djibouti | YuriLanzini | BLPM2opt | 6808.0 | 0.0 | 0.0 | 102.28 |
| Djibouti | YuriLanzini | BLPM2opt | 7156.0 | 0.0 | 0.0 | 107.51 |
| Djibouti | YuriLanzini | BLPM2opt | 7075.0 | 0.0 | 0.0 | 106.3 |
| Djibouti | YuriLanzini | BLPM2opt | 7156.0 | 0.0 | 0.0 | 107.51 |
| Djibouti | YuriLanzini | BLPM2opt | 7156.0 | 0.0 | 0.0 | 107.51 |
| Djibouti | YuriLanzini | BLPM2opt | 6808.0 | 0.0 | 0.0 | 102.28 |
| Djibouti | YuriLanzini | BLPM2opt | 6707.0 | 0.0 | 0.0 | 100.77 |
| Djibouti | YuriLanzini | BLPMnode-swap | 11092.0 | 0.0 | 0.0 | 166.65 |
| Djibouti | YuriLanzini | BLPMnode-swap | 10813.0 | 0.0 | 0.0 | 162.45 |
| Djibouti | YuriLanzini | BLPMnode-swap | 13069.0 | 0.0 | 0.0 | 196.35 |
| Djibouti | YuriLanzini | BLPMnode-swap | 10091.0 | 0.0 | 0.0 | 151.61 |
| Djibouti | YuriLanzini | BLPMnode-swap | 10294.0 | 0.0 | 0.0 | 154.66 |
| Djibouti | YuriLanzini | BLPMnode-swap | 10438.0 | 0.0 | 0.0 | 156.82 |
| Djibouti | YuriLanzini | BLPMnode-swap | 11775.0 | 0.0 | 0.0 | 176.91 |
| Djibouti | YuriLanzini | BLPMnode-swap | 12392.0 | 0.0 | 0.0 | 186.18 |
| Djibouti | YuriLanzini | BLPMnode-swap | 10124.0 | 0.0 | 0.0 | 152.1 |
| Djibouti | YuriLanzini | BLPMnode-swap | 9944.0 | 0.0 | 0.0 | 149.4 |
| Djibouti | YuriLanzini | BLPMsh | 8873.0 | 0.0 | 0.0 | 133.31 |
| Djibouti | YuriLanzini | BLPMsh | 9528.0 | 0.0 | 0.01 | 143.15 |
| Djibouti | YuriLanzini | BLPMsh | 8610.0 | 0.0 | 0.01 | 129.36 |
| Djibouti | YuriLanzini | BLPMsh | 8643.0 | 0.0 | 0.0 | 129.85 |
| Djibouti | YuriLanzini | BLPMsh | 7657.0 | 0.0 | 0.01 | 115.04 |
| Djibouti | YuriLanzini | BLPMsh | 7687.0 | 0.0 | 0.01 | 115.49 |
| Djibouti | YuriLanzini | BLPMsh | 9412.0 | 0.0 | 0.01 | 141.41 |
| Djibouti | YuriLanzini | BLPMsh | 9072.0 | 0.0 | 0.01 | 136.3 |
| Djibouti | YuriLanzini | BLPMsh | 8278.0 | 0.0 | 0.0 | 124.37 |
| Djibouti | YuriLanzini | BLPMsh | 8822.0 | 0.0 | 0.0 | 132.54 |

| Instância | autoria | algoritmo | q-medio | q-desvio | t-medio | % do ótimo |
|------------------|-------------|---------------|---------|----------|---------|------------|
| Instância: Qatar | | | | | | |
| Qatar | YuriLanzini | BLMM2opt | 9975.0 | 0.0 | 0.24 | 106.66 |
| Qatar | YuriLanzini | BLMM2opt | 10586.0 | 0.0 | 0.38 | 113.2 |
| Qatar | YuriLanzini | BLMM2opt | 10066.0 | 0.0 | 0.25 | 107.63 |
| Qatar | YuriLanzini | BLMM2opt | 10096.0 | 0.0 | 0.24 | 107.96 |
| Qatar | YuriLanzini | BLMM2opt | 9904.0 | 0.0 | 0.27 | 105.9 |
| Qatar | YuriLanzini | BLMM2opt | 10173.0 | 0.0 | 0.22 | 108.78 |
| Qatar | YuriLanzini | BLMM2opt | 10585.0 | 0.0 | 0.22 | 113.18 |
| Qatar | YuriLanzini | BLMM2opt | 10247.0 | 0.0 | 0.29 | 109.57 |
| Qatar | YuriLanzini | BLMM2opt | 9972.0 | 0.0 | 0.26 | 106.63 |
| Qatar | YuriLanzini | BLMM2opt | 10350.0 | 0.0 | 0.33 | 110.67 |
| Qatar | YuriLanzini | BLMMnode-swap | 20360.0 | 0.0 | 0.35 | 217.71 |
| Qatar | YuriLanzini | BLMMnode-swap | 20402.3 | 367.07 | 0.38 | 218.16 |
| Qatar | YuriLanzini | BLMMnode-swap | 19705.0 | 0.0 | 0.41 | 210.7 |
| Qatar | YuriLanzini | BLMMnode-swap | 18936.4 | 247.92 | 0.38 | 202.49 |
| Qatar | YuriLanzini | BLMMnode-swap | 24964.4 | 04.09 | 0.39 | 266.94 |
| Qatar | YuriLanzini | BLMMnode-swap | 19980.2 | 38.58 | 0.54 | 213.65 |
| Qatar | YuriLanzini | BLMMnode-swap | 24476.2 | 50.63 | 0.35 | 261.72 |
| Qatar | YuriLanzini | BLMMnode-swap | 20310.7 | 2.21 | 0.39 | 217.18 |
| Qatar | YuriLanzini | BLMMnode-swap | 22133.9 | 12.33 | 0.32 | 236.68 |
| Qatar | YuriLanzini | BLMMnode-swap | 21673.0 | 0.0 | 0.37 | 231.75 |
| Qatar | YuriLanzini | BLMMsh | 15640.4 | 26.14 | 0.85 | 167.24 |
| Qatar | YuriLanzini | BLMMsh | 13091.4 | 104.15 | 0.93 | 139.99 |
| Qatar | YuriLanzini | BLMMsh | 14922.0 | 0.0 | 0.78 | 159.56 |
| Qatar | YuriLanzini | BLMMsh | 14277.0 | 0.0 | 0.76 | 152.66 |
| Qatar | YuriLanzini | BLMMsh | 16563.0 | 0.0 | 0.73 | 177.11 |
| Qatar | YuriLanzini | BLMMsh | 12851.0 | 0.0 | 1.1 | 137.41 |
| Qatar | YuriLanzini | BLMMsh | 14885.0 | 0.0 | 0.87 | 159.16 |
| Qatar | YuriLanzini | BLMMsh | 13088.0 | 0.0 | 0.93 | 139.95 |
| Qatar | YuriLanzini | BLMMsh | 14610.1 | 05.02 | 0.86 | 156.22 |
| Qatar | YuriLanzini | BLMMsh | 13085.0 | 0.0 | 0.83 | 139.92 |
| Qatar | YuriLanzini | BLPM2opt | 10433.0 | 0.0 | 0.28 | 111.56 |
| Qatar | YuriLanzini | BLPM2opt | 9956.0 | 0.0 | 0.34 | 106.46 |
| Qatar | YuriLanzini | BLPM2opt | 10269.0 | 0.0 | 0.31 | 109.81 |
| Qatar | YuriLanzini | BLPM2opt | 9994.0 | 0.0 | 0.26 | 106.86 |
| Qatar | YuriLanzini | BLPM2opt | 10066.0 | 0.0 | 0.5 | 107.63 |
| Qatar | YuriLanzini | BLPM2opt | 10015.0 | 0.0 | 0.28 | 107.09 |
| Qatar | YuriLanzini | BLPM2opt | 10164.0 | 0.0 | 0.33 | 108.68 |
| Qatar | YuriLanzini | BLPM2opt | 9807.0 | 0.0 | 0.33 | 104.87 |
| Qatar | YuriLanzini | BLPM2opt | 9896.0 | 0.0 | 0.24 | 105.82 |
| Qatar | YuriLanzini | BLPM2opt | 10340.0 | 0.0 | 0.28 | 110.56 |
| Qatar | YuriLanzini | BLPMnode-swap | 20752.0 | 0.0 | 0.16 | 221.9 |
| Qatar | YuriLanzini | BLPMnode-swap | 16672.0 | 0.0 | 0.31 | 178.27 |
| Qatar | YuriLanzini | BLPMnode-swap | 18158.0 | 0.0 | 0.23 | 194.16 |
| Qatar | YuriLanzini | BLPMnode-swap | 18039.0 | 0.0 | 0.34 | 192.89 |
| Qatar | YuriLanzini | BLPMnode-swap | 18580.0 | 0.0 | 0.19 | 198.67 |
| Qatar | YuriLanzini | BLPMnode-swap | 18739.0 | 0.0 | 0.36 | 200.37 |
| Qatar | YuriLanzini | BLPMnode-swap | 20482.0 | 0.0 | 0.2 | 219.01 |
| Qatar | YuriLanzini | BLPMnode-swap | 17259.0 | 0.0 | 0.33 | 184.55 |
| Qatar | YuriLanzini | BLPMnode-swap | 19049.0 | 0.0 | 0.26 | 203.69 |
| Qatar | YuriLanzini | BLPMnode-swap | 19113.0 | 0.0 | 0.29 | 204.37 |
| Qatar | YuriLanzini | BLPMsh | 14847.0 | 0.0 | 0.47 | 158.76 |
| Qatar | YuriLanzini | BLPMsh | 13732.0 | 0.0 | 0.52 | 146.83 |
| Qatar | YuriLanzini | BLPMsh | 12241.0 | 0.0 | 0.47 | 130.89 |
| Qatar | YuriLanzini | BLPMsh | 14113.0 | 0.0 | 0.43 | 150.91 |
| Qatar | YuriLanzini | BLPMsh | 12678.0 | 0.0 | 0.83 | 135.56 |
| Qatar | YuriLanzini | BLPMsh | 14601.0 | 0.0 | 0.51 | 156.13 |
| Qatar | YuriLanzini | BLPMsh | 12026.0 | 0.0 | 0.67 | 128.59 |
| Qatar | YuriLanzini | BLPMsh | 13552.0 | 0.0 | 0.64 | 144.91 |
| Qatar | YuriLanzini | BLPMsh | 11860.0 | 0.0 | 0.45 | 126.82 |
| Qatar | YuriLanzini | BLPMsh | 12202.0 | 0.0 | 0.54 | 130.47 |

| Instância | autoria | algoritmo | q-medio | q-desvio | t-medio | % do ótimo |
|--------------------|-------------|---------------|----------|-----------|---------|------------|
| Instância: Uruguay | | | | | | |
| Uruguay | YuriLanzini | BLMM2opt | 107246.1 | 60581.15 | 19.29 | 135.56 |
| Uruguay | YuriLanzini | BLMM2opt | 109220.1 | 60066.25 | 21.15 | 138.05 |
| Uruguay | YuriLanzini | BLMM2opt | 110260.2 | 64193.41 | 19.63 | 139.37 |
| Uruguay | YuriLanzini | BLMM2opt | 112094.1 | 72291.85 | 20.09 | 141.69 |
| Uruguay | YuriLanzini | BLMM2opt | 116369.8 | 82586.44 | 20.67 | 147.09 |
| Uruguay | YuriLanzini | BLMM2opt | 107761.9 | 58895.46 | 19.84 | 136.21 |
| Uruguay | YuriLanzini | BLMM2opt | 106979.9 | 57076.81 | 19.14 | 135.22 |
| Uruguay | YuriLanzini | BLMM2opt | 105840.2 | 58330.14 | 19.42 | 133.78 |
| Uruguay | YuriLanzini | BLMM2opt | 106085.8 | 56534.12 | 18.98 | 134.09 |
| Uruguay | YuriLanzini | BLMM2opt | 111078.4 | 62340.62 | 21.08 | 140.4 |
| Uruguay | YuriLanzini | BLMMnode-swap | 354346.7 | 93571.82 | 44.93 | 447.89 |
| Uruguay | YuriLanzini | BLMMnode-swap | 331012.5 | 97531.65 | 48.24 | 418.4 |
| Uruguay | YuriLanzini | BLMMnode-swap | 362085.2 | 89896.82 | 48.55 | 457.68 |
| Uruguay | YuriLanzini | BLMMnode-swap | 358814.0 | 87177.57 | 44.94 | 453.54 |
| Uruguay | YuriLanzini | BLMMnode-swap | 352691.3 | 106036.77 | 44.9 | 445.8 |
| Uruguay | YuriLanzini | BLMMnode-swap | 336800.9 | 101144.25 | 44.57 | 425.72 |
| Uruguay | YuriLanzini | BLMMnode-swap | 350127.4 | 91202.8 | 46.51 | 442.56 |
| Uruguay | YuriLanzini | BLMMnode-swap | 345342.6 | 97386.92 | 49.71 | 436.51 |
| Uruguay | YuriLanzini | BLMMnode-swap | 336728.1 | 81170.59 | 40.56 | 425.62 |
| Uruguay | YuriLanzini | BLMMnode-swap | 342359.2 | 100727.91 | 46.1 | 432.74 |
| Uruguay | YuriLanzini | BLMMsh | 426156.5 | 273429.08 | 69.04 | 538.66 |
| Uruguay | YuriLanzini | BLMMsh | 435028.1 | 277113.23 | 68.9 | 549.87 |
| Uruguay | YuriLanzini | BLMMsh | 424126.0 | 270548.59 | 68.99 | 536.09 |
| Uruguay | YuriLanzini | BLMMsh | 440415.8 | 277832.38 | 68.91 | 556.69 |
| Uruguay | YuriLanzini | BLMMsh | 420275.9 | 269665.61 | 68.93 | 531.23 |
| Uruguay | YuriLanzini | BLMMsh | 439211.2 | 284407.85 | 69.09 | 555.16 |
| Uruguay | YuriLanzini | BLMMsh | 408619.8 | 273097.26 | 68.82 | 516.49 |
| Uruguay | YuriLanzini | BLMMsh | 430126.3 | 278365.51 | 69.0 | 543.68 |
| Uruguay | YuriLanzini | BLMMsh | 427410.5 | 286102.03 | 68.94 | 540.25 |
| Uruguay | YuriLanzini | BLMMsh | 425551.8 | 279911.39 | 68.88 | 537.9 |
| Uruguay | YuriLanzini | BLPM2opt | 157226.7 | 123680.79 | 33.15 | 198.73 |
| Uruguay | YuriLanzini | BLPM2opt | 164644.4 | 139472.12 | 37.35 | 208.11 |
| Uruguay | YuriLanzini | BLPM2opt | 121438.9 | 78397.74 | 26.02 | 153.5 |
| Uruguay | YuriLanzini | BLPM2opt | 142475.2 | 105634.63 | 32.27 | 180.09 |
| Uruguay | YuriLanzini | BLPM2opt | 169767.4 | 139891.02 | 36.82 | 214.59 |
| Uruguay | YuriLanzini | BLPM2opt | 178624.9 | 146284.35 | 40.21 | 225.78 |
| Uruguay | YuriLanzini | BLPM2opt | 173482.1 | 137862.62 | 42.53 | 219.28 |
| Uruguay | YuriLanzini | BLPM2opt | 149079.6 | 116482.14 | 33.81 | 188.44 |
| Uruguay | YuriLanzini | BLPM2opt | 167741.0 | 143278.3 | 38.54 | 212.02 |
| Uruguay | YuriLanzini | BLPM2opt | 135392.7 | 114516.37 | 26.42 | 171.14 |
| Uruguay | YuriLanzini | BLPMnode-swap | 233222.0 | 16883.38 | 22.93 | 294.79 |
| Uruguay | YuriLanzini | BLPMnode-swap | 228582.9 | 14003.1 | 21.22 | 288.93 |
| Uruguay | YuriLanzini | BLPMnode-swap | 216327.6 | 24180.86 | 29.7 | 273.44 |
| Uruguay | YuriLanzini | BLPMnode-swap | 232389.5 | 11645.15 | 19.79 | 293.74 |
| Uruguay | YuriLanzini | BLPMnode-swap | 247579.2 | 12667.53 | 20.8 | 312.94 |
| Uruguay | YuriLanzini | BLPMnode-swap | 222951.9 | 6643.38 | 16.0 | 281.81 |
| Uruguay | YuriLanzini | BLPMnode-swap | 243422.8 | 21141.42 | 28.68 | 307.69 |
| Uruguay | YuriLanzini | BLPMnode-swap | 224784.3 | 10097.0 | 19.5 | 284.13 |
| Uruguay | YuriLanzini | BLPMnode-swap | 236550.2 | 14375.55 | 22.67 | 299.0 |
| Uruguay | YuriLanzini | BLPMnode-swap | 231428.5 | 12565.77 | 17.21 | 292.53 |
| Uruguay | YuriLanzini | BLPMsh | 196943.6 | 95047.62 | 63.28 | 248.94 |
| Uruguay | YuriLanzini | BLPMsh | 190637.5 | 83188.85 | 52.28 | 240.97 |
| Uruguay | YuriLanzini | BLPMsh | 197092.6 | 96274.18 | 52.99 | 249.12 |
| Uruguay | YuriLanzini | BLPMsh | 157153.9 | 56949.16 | 45.1 | 198.64 |
| Uruguay | YuriLanzini | BLPMsh | 143594.6 | 41188.07 | 36.11 | 181.5 |
| Uruguay | YuriLanzini | BLPMsh | 157011.9 | 47117.73 | 40.85 | 198.46 |
| Uruguay | YuriLanzini | BLPMsh | 193518.9 | 87703.05 | 61.06 | 244.61 |
| Uruguay | YuriLanzini | BLPMsh | 168098.3 | 60431.17 | 43.9 | 212.48 |
| Uruguay | YuriLanzini | BLPMsh | 165148.4 | 59664.37 | 37.9 | 208.75 |
| Uruguay | YuriLanzini | BLPMsh | 154659.3 | 44276.28 | 44.54 | 195.49 |

| Instância | autoria | algoritmo | q-medio | q-desvio | t-medio | % do ótimo |
|---------------------------|-------------|---------------|---------|----------|---------|------------|
| Instância: Western Sahara | | | | | | |
| Western Sahara | YuriLanzini | BLMM2opt | 28084.0 | 0.0 | 0.0 | 101.74 |
| Western Sahara | YuriLanzini | BLMM2opt | 28512.0 | 0.0 | 0.0 | 103.29 |
| Western Sahara | YuriLanzini | BLMM2opt | 28779.0 | 0.0 | 0.0 | 104.26 |
| Western Sahara | YuriLanzini | BLMM2opt | 28566.0 | 0.0 | 0.0 | 103.49 |
| Western Sahara | YuriLanzini | BLMM2opt | 28084.0 | 0.0 | 0.0 | 101.74 |
| Western Sahara | YuriLanzini | BLMM2opt | 28590.0 | 0.0 | 0.0 | 103.58 |
| Western Sahara | YuriLanzini | BLMM2opt | 28737.0 | 0.0 | 0.0 | 104.11 |
| Western Sahara | YuriLanzini | BLMM2opt | 28804.0 | 0.0 | 0.0 | 104.35 |
| Western Sahara | YuriLanzini | BLMM2opt | 27603.0 | 0.0 | 0.0 | 100.0 |
| Western Sahara | YuriLanzini | BLMM2opt | 29401.0 | 0.0 | 0.0 | 106.51 |
| Western Sahara | YuriLanzini | BLMMnode-swap | 31795.0 | 0.0 | 0.0 | 115.19 |
| Western Sahara | YuriLanzini | BLMMnode-swap | 30232.0 | 0.0 | 0.0 | 109.52 |
| Western Sahara | YuriLanzini | BLMMnode-swap | 33458.0 | 0.0 | 0.0 | 121.21 |
| Western Sahara | YuriLanzini | BLMMnode-swap | 34994.0 | 0.0 | 0.0 | 126.78 |
| Western Sahara | YuriLanzini | BLMMnode-swap | 36356.0 | 0.0 | 0.0 | 131.71 |
| Western Sahara | YuriLanzini | BLMMnode-swap | 39431.0 | 0.0 | 0.0 | 142.85 |
| Western Sahara | YuriLanzini | BLMMnode-swap | 28870.0 | 0.0 | 0.0 | 104.59 |
| Western Sahara | YuriLanzini | BLMMnode-swap | 36339.0 | 0.0 | 0.0 | 131.65 |
| Western Sahara | YuriLanzini | BLMMnode-swap | 47291.1 | 265.95 | 0.0 | 171.33 |
| Western Sahara | YuriLanzini | BLMMnode-swap | 37332.0 | 0.0 | 0.0 | 135.25 |
| Western Sahara | YuriLanzini | BLMMsh | 36740.0 | 0.0 | 0.0 | 133.1 |
| Western Sahara | YuriLanzini | BLMMsh | 29556.0 | 0.0 | 0.0 | 107.08 |
| Western Sahara | YuriLanzini | BLMMsh | 29500.0 | 0.0 | 0.0 | 106.87 |
| Western Sahara | YuriLanzini | BLMMsh | 29034.0 | 0.0 | 0.0 | 105.18 |
| Western Sahara | YuriLanzini | BLMMsh | 27603.0 | 0.0 | 0.0 | 100.0 |
| Western Sahara | YuriLanzini | BLMMsh | 28779.0 | 0.0 | 0.0 | 104.26 |
| Western Sahara | YuriLanzini | BLMMsh | 30393.1 | 560.04 | 0.0 | 110.11 |
| Western Sahara | YuriLanzini | BLMMsh | 29500.0 | 0.0 | 0.0 | 106.87 |
| Western Sahara | YuriLanzini | BLMMsh | 28376.0 | 0.0 | 0.0 | 102.8 |
| Western Sahara | YuriLanzini | BLMMsh | 27603.0 | 0.0 | 0.0 | 100.0 |
| Western Sahara | YuriLanzini | BLPM2opt | 29046.0 | 0.0 | 0.0 | 105.23 |
| Western Sahara | YuriLanzini | BLPM2opt | 29264.0 | 0.0 | 0.0 | 106.02 |
| Western Sahara | YuriLanzini | BLPM2opt | 27750.0 | 0.0 | 0.0 | 100.53 |
| Western Sahara | YuriLanzini | BLPM2opt | 27750.0 | 0.0 | 0.0 | 100.53 |
| Western Sahara | YuriLanzini | BLPM2opt | 28943.0 | 0.0 | 0.0 | 104.85 |
| Western Sahara | YuriLanzini | BLPM2opt | 29046.0 | 0.0 | 0.0 | 105.23 |
| Western Sahara | YuriLanzini | BLPM2opt | 28147.0 | 0.0 | 0.0 | 101.97 |
| Western Sahara | YuriLanzini | BLPM2opt | 27750.0 | 0.0 | 0.0 | 100.53 |
| Western Sahara | YuriLanzini | BLPM2opt | 29218.0 | 0.0 | 0.0 | 105.85 |
| Western Sahara | YuriLanzini | BLPM2opt | 28022.0 | 0.0 | 0.0 | 101.52 |
| Western Sahara | YuriLanzini | BLPMnode-swap | 40732.0 | 0.0 | 0.0 | 147.56 |
| Western Sahara | YuriLanzini | BLPMnode-swap | 33452.0 | 0.0 | 0.0 | 121.19 |
| Western Sahara | YuriLanzini | BLPMnode-swap | 37583.0 | 0.0 | 0.0 | 136.16 |
| Western Sahara | YuriLanzini | BLPMnode-swap | 36307.0 | 0.0 | 0.0 | 131.53 |
| Western Sahara | YuriLanzini | BLPMnode-swap | 33704.0 | 0.0 | 0.0 | 122.1 |
| Western Sahara | YuriLanzini | BLPMnode-swap | 36496.0 | 0.0 | 0.0 | 132.22 |
| Western Sahara | YuriLanzini | BLPMnode-swap | 34838.0 | 0.0 | 0.0 | 126.21 |
| Western Sahara | YuriLanzini | BLPMnode-swap | 37157.0 | 0.0 | 0.0 | 134.61 |
| Western Sahara | YuriLanzini | BLPMnode-swap | 43588.0 | 0.0 | 0.0 | 157.91 |
| Western Sahara | YuriLanzini | BLPMnode-swap | 33184.0 | 0.0 | 0.0 | 120.22 |
| Western Sahara | YuriLanzini | BLPMsh | 30216.0 | 0.0 | 0.0 | 109.47 |
| Western Sahara | YuriLanzini | BLPMsh | 28376.0 | 0.0 | 0.0 | 102.8 |
| Western Sahara | YuriLanzini | BLPMsh | 34460.0 | 0.0 | 0.0 | 124.84 |
| Western Sahara | YuriLanzini | BLPMsh | 29018.0 | 0.0 | 0.0 | 105.13 |
| Western Sahara | YuriLanzini | BLPMsh | 29647.0 | 0.0 | 0.0 | 107.4 |
| Western Sahara | YuriLanzini | BLPMsh | 29500.0 | 0.0 | 0.0 | 106.87 |
| Western Sahara | YuriLanzini | BLPMsh | 29556.0 | 0.0 | 0.0 | 107.08 |
| Western Sahara | YuriLanzini | BLPMsh | 28044.0 | 0.0 | 0.0 | 101.6 |
| Western Sahara | YuriLanzini | BLPMsh | 27603.0 | 0.0 | 0.0 | 100.0 |
| Western Sahara | YuriLanzini | BLPMsh | 35309.0 | 0.0 | 0.0 | 127.92 |

| Instância | autoria | algoritmo | q-medio | q-desvio | t-medio | % do ótimo |
|----------------------------|-------------|---------------|----------|-----------|---------|------------|
| Instância: Zimbabwe | | | | | | |
| Zimbabwe | YuriLanzini | BLMM2opt | 181065.4 | 198436.47 | 40.25 | 189.91 |
| Zimbabwe | YuriLanzini | BLMM2opt | 183081.8 | 206751.78 | 40.77 | 192.02 |
| Zimbabwe | YuriLanzini | BLMM2opt | 179027.4 | 192095.95 | 40.83 | 187.77 |
| Zimbabwe | YuriLanzini | BLMM2opt | 174489.9 | 188217.07 | 41.47 | 183.01 |
| Zimbabwe | YuriLanzini | BLMM2opt | 181879.2 | 194751.08 | 40.94 | 190.76 |
| Zimbabwe | YuriLanzini | BLMM2opt | 186409.5 | 213806.42 | 41.53 | 195.51 |
| Zimbabwe | YuriLanzini | BLMM2opt | 202864.4 | 242139.43 | 45.96 | 212.77 |
| Zimbabwe | YuriLanzini | BLMM2opt | 171129.9 | 178010.42 | 39.77 | 179.48 |
| Zimbabwe | YuriLanzini | BLMM2opt | 177240.1 | 188174.06 | 38.57 | 185.89 |
| Zimbabwe | YuriLanzini | BLMM2opt | 177796.1 | 190472.88 | 39.03 | 186.48 |
| Zimbabwe | YuriLanzini | BLMMnode-swap | 563780.2 | 175968.88 | 87.07 | 591.31 |
| Zimbabwe | YuriLanzini | BLMMnode-swap | 615273.2 | 228370.85 | 87.22 | 645.31 |
| Zimbabwe | YuriLanzini | BLMMnode-swap | 549669.2 | 172933.94 | 87.17 | 576.51 |
| Zimbabwe | YuriLanzini | BLMMnode-swap | 566796.1 | 166792.51 | 87.19 | 594.47 |
| Zimbabwe | YuriLanzini | BLMMnode-swap | 578747.2 | 176913.73 | 87.17 | 607.0 |
| Zimbabwe | YuriLanzini | BLMMnode-swap | 532717.2 | 171062.29 | 87.1 | 558.73 |
| Zimbabwe | YuriLanzini | BLMMnode-swap | 560233.8 | 198566.12 | 87.19 | 587.59 |
| Zimbabwe | YuriLanzini | BLMMnode-swap | 535016.4 | 167750.28 | 87.05 | 561.14 |
| Zimbabwe | YuriLanzini | BLMMnode-swap | 533588.6 | 170899.92 | 87.16 | 559.64 |
| Zimbabwe | YuriLanzini | BLMMnode-swap | 539838.8 | 166879.32 | 87.1 | 566.2 |
| Zimbabwe | YuriLanzini | BLMMsh | 807657.9 | 413693.52 | 87.35 | 847.09 |
| Zimbabwe | YuriLanzini | BLMMsh | 822505.5 | 410958.96 | 87.38 | 862.66 |
| Zimbabwe | YuriLanzini | BLMMsh | 831845.2 | 398656.59 | 87.17 | 872.46 |
| Zimbabwe | YuriLanzini | BLMMsh | 815624.7 | 418988.12 | 87.4 | 855.45 |
| Zimbabwe | YuriLanzini | BLMMsh | 791970.5 | 429583.19 | 87.38 | 830.64 |
| Zimbabwe | YuriLanzini | BLMMsh | 806347.2 | 411747.05 | 87.51 | 845.72 |
| Zimbabwe | YuriLanzini | BLMMsh | 870798.4 | 432942.85 | 87.39 | 913.31 |
| Zimbabwe | YuriLanzini | BLMMsh | 789445.3 | 410965.73 | 87.48 | 827.99 |
| Zimbabwe | YuriLanzini | BLMMsh | 812645.8 | 409292.69 | 87.28 | 852.32 |
| Zimbabwe | YuriLanzini | BLMMsh | 796099.8 | 411388.25 | 87.27 | 834.97 |
| Zimbabwe | YuriLanzini | BLPM2opt | 309371.5 | 213627.05 | 87.03 | 324.48 |
| Zimbabwe | YuriLanzini | BLPM2opt | 175278.3 | 117620.27 | 53.96 | 183.84 |
| Zimbabwe | YuriLanzini | BLPM2opt | 266324.0 | 180605.44 | 86.71 | 279.33 |
| Zimbabwe | YuriLanzini | BLPM2opt | 241923.0 | 163168.6 | 80.0 | 253.73 |
| Zimbabwe | YuriLanzini | BLPM2opt | 221127.8 | 149241.07 | 79.43 | 231.92 |
| Zimbabwe | YuriLanzini | BLPM2opt | 202718.8 | 131767.02 | 54.06 | 212.62 |
| Zimbabwe | YuriLanzini | BLPM2opt | 191090.6 | 87466.18 | 69.31 | 200.42 |
| Zimbabwe | YuriLanzini | BLPM2opt | 231508.1 | 163182.15 | 73.6 | 242.81 |
| Zimbabwe | YuriLanzini | BLPM2opt | 155192.6 | 72304.78 | 62.39 | 162.77 |
| Zimbabwe | YuriLanzini | BLPM2opt | 190647.1 | 126375.51 | 48.57 | 199.96 |
| Zimbabwe | YuriLanzini | BLPMnode-swap | 286342.1 | 18084.19 | 35.22 | 300.32 |
| Zimbabwe | YuriLanzini | BLPMnode-swap | 357835.7 | 42414.51 | 87.08 | 375.31 |
| Zimbabwe | YuriLanzini | BLPMnode-swap | 341280.7 | 53931.78 | 87.06 | 357.94 |
| Zimbabwe | YuriLanzini | BLPMnode-swap | 321744.9 | 49293.83 | 63.34 | 337.45 |
| Zimbabwe | YuriLanzini | BLPMnode-swap | 338400.6 | 41610.95 | 63.91 | 354.92 |
| Zimbabwe | YuriLanzini | BLPMnode-swap | 345299.2 | 49405.22 | 80.17 | 362.16 |
| Zimbabwe | YuriLanzini | BLPMnode-swap | 320088.6 | 48652.41 | 66.05 | 335.72 |
| Zimbabwe | YuriLanzini | BLPMnode-swap | 367347.2 | 73986.76 | 61.83 | 385.28 |
| Zimbabwe | YuriLanzini | BLPMnode-swap | 293843.6 | 43274.32 | 61.85 | 308.19 |
| Zimbabwe | YuriLanzini | BLPMnode-swap | 318556.3 | 41323.65 | 67.39 | 334.11 |
| Zimbabwe | YuriLanzini | BLPMsh | 265404.0 | 119223.91 | 87.04 | 278.36 |
| Zimbabwe | YuriLanzini | BLPMsh | 362861.3 | 172378.98 | 87.1 | 380.58 |
| Zimbabwe | YuriLanzini | BLPMsh | 379264.1 | 161506.15 | 87.02 | 397.78 |
| Zimbabwe | YuriLanzini | BLPMsh | 300465.5 | 116096.04 | 87.07 | 315.14 |
| Zimbabwe | YuriLanzini | BLPMsh | 405995.5 | 216662.21 | 87.01 | 425.82 |
| Zimbabwe | YuriLanzini | BLPMsh | 356477.4 | 170770.56 | 87.01 | 373.88 |
| Zimbabwe | YuriLanzini | BLPMsh | 334109.9 | 144593.78 | 87.05 | 350.42 |
| Zimbabwe | YuriLanzini | BLPMsh | 301178.7 | 187837.04 | 87.04 | 315.88 |
| Zimbabwe | YuriLanzini | BLPMsh | 268437.6 | 100824.47 | 87.07 | 281.54 |
| Zimbabwe | YuriLanzini | BLPMsh | 385441.6 | 195710.26 | 86.99 | 404.26 |