

## Overview Of Results- Population Based

| Problem      | MOSER | HEU   | CPCCP | FLTS  | RLS    | TLBO  | BBA*   | COA*   | GA     | ABC*   | MMHPH  |
|--------------|-------|-------|-------|-------|--------|-------|--------|--------|--------|--------|--------|
| I01-I13      | 32.6  | 4.96  | 5.68  | 4.61  | 3.64   | 2.38  | 3.65   | 2.74   | 2.2    | 3.95   | 1.98   |
| MMKP01       | 3.61  | 4.59  | 3.49  | 3.32  | 1.77   | 0     | 0.0575 | 0.0173 | 0.0173 | 0      | 0      |
| MMKP02       | 2.97  | 4.31  | 3.73  | 3.48  | 2.73   | 0.195 | 0.933  | 0.287  | 0.346  | 0.787  | 0.26   |
| MMKP03       | 2.71  | 2.58  | 3.3   | 2.78  | 2.88   | 0.976 | 3.39   | 0.957  | 0.564  | 4.02   | 0.584  |
| MMKP04       | 7.22  | 30.3  | 8.77  | 6.65  | 3.64   | 0.346 | 0.995  | 0.2    | 0.324  | 0.0995 | 0.47   |
| MMKP05       | 4.42  | 6.33  | 6.2   | 3.21  | 3.37   | 0.498 | 2.05   | 0.388  | 0.26   | 1.25   | 0.27   |
| MMKP06       | 3.84  | 10.6  | 4.94  | 3.14  | 2.89   | 1.71  | 4.54   | 1.47   | 1      | 5.09   | 0.839  |
| MMKP07       | 10.2  |       | 12    | 8.15  | 6.01   | 0.64  | 0.98   | 0.985  | 1.12   | 0.361  | 0.792  |
| MMKP08       | 8.64  |       | 10.3  | 6.91  | 4.62   | 0.898 | 4.06   | 1.21   | 1.03   | 2.46   | 1.24   |
| MMKP09       | 6.91  | 10.2  | 8.57  | 8.06  | 4.43   | 3.09  | 7.08   | 3.42   | 2.42   | 7.21   | 1.81   |
| MMKP10       | 32.4  | 2.18  | 5     | 3.61  | 3.98   | 2.15  | 5.72   | 1.94   | 1.37   | 6.3    | 1.07   |
| MMKP11       | 32.3  | 1.35  | 6.87  | 7.15  | 3.46   | 4.99  | 9.28   | 4.45   | 3.43   | 9.56   | 2.05   |
| MMKP12       | 27.3  | 0.817 | 4.58  | 6.79  | 3.08   | 3.9   | 6.62   | 3.43   | 3.31   | 7.98   | 2.21   |
| MMKP13       | 26    |       | 5.09  | 3.07  | 2.77   | 4.79  | 8.85   | 4.26   | 3.98   | 9.92   | 2.53   |
| MMKP14       | 17.9  | 3.88  | 4.81  | 2.96  | 2.41   | 4.56  | 8.17   | 3.88   | 4.42   | 9.92   | 2.79   |
| MMKP15       | 10.8  |       | 1.76  | 3.02  | 1.24   | 3.5   | 6.83   | 2.44   | 3.01   | 8.84   | 1.48   |
| MMKP16       |       |       | 2.02  | 1.97  | 1.01   | 3.26  | 6.39   | 1.89   | 2.76   | 8.91   | 1.02   |
| MMKP17       |       |       | 0.944 | 1.4   | 0.695  | 2.23  | 5.92   | 1.32   | 2.51   | 7.95   | 0.842  |
| MMKP18       |       |       | 2.45  | 1.82  | 0.645  | 1.98  | 5.38   | 1.04   | 1.95   | 7.92   | 0.558  |
| MMKP19       |       |       | 0     | 0     | 0.0221 | 1.62  | 1.78   | 0      | 1.19   | 3.9    | 0      |
| MMKP20       |       |       | 0.352 | 0.907 | 0.742  | 0.825 | 3.46   | 0.112  | 0.946  | 6.14   | 0.0259 |
| Average Dev: | 14.4  | 6.84  | 4.8   | 3.95  | 2.67   | 2.12  | 4.58   | 1.73   | 1.82   | 5.36   | 1.09   |

(\*) indicates algorithm has not yet been updated with results from larger population size (90). Population size used is 60.