ALGORITHMIC METHODS FOR MATHEMATICAL MODELS - Lab 1

Goktug Cengiz

30 September 2019

1 Tasks

1. **Explain how equation 1 is ensured by the linear program. Specifically: why is z guaranteed to be equal to the load of the highest loaded computer?**

   The equation 1 is implemented in the last constraint. To guarantee that z is equal to the load of the highest loaded computer, we define z as a number which will be greater than all the loads, and we guarantee that this number will be a load and not any other number because we are minimizing z.

2. **Following the instructions of section 4, implement the model in OPL and run it on the given data. Run it with several data files; for example, change the processing capacity of one or more of the computers and run it again.**

   I have already done it and these are the results obtained: // Max. unscaled (scaled) |red-cost| = 1 (1) // Condition number of scaled basis = 4.2e+000 // z = 0.72377; x_tc = [[0.99587 0 0.0041322] [0 0.096347 0.90365] [0 1 0] [1 0 0]]; Total load 1238.47 Max load 0.723773CPU 1 loaded at 0.723773CPU 2 loaded at 0.723773CPU 3 loaded at 0.723773

3. **By how much can the capacity of the third computer be reduced so that all the tasks can still be processed? Try reducing it more than the limit and check that the model becomes infeasible**

   We can see with the post-processing code that each computer is using only the 73% of it capacity, so for this kind of problem we can use computers with less capacity, which will be cheaper.