Backpack Rardin Example – Summary of Results from Running AMPL Partial Master and Subproblems created by Dr. Novoa

Datzig – Wolfe Decomposition Lecture - Dr. Clara Novoa

Compare results to the ones on Rardin page 842 …

| Iteration | Partial Master Problem | Subproblem offshore | Subproblem domestic |
| --- | --- | --- | --- |
| l = 0 | Begin with one arbitrarily selected extreme point for each site that makes the entire LP feasible |  |  |
| l = 1 | Solving the master problem with one extreme point for each site and no extreme directions for offshore, we get:  Decision Variables values:    Duals values:    Partial master obj. value = 260 | Unbounded problem    Extreme direction given by AMPL with command display x.unbdd  unbounded | Objval = 256 |
| l = 2 | Solving the master problem with one extreme point and one extreme direction generated so far for offshore and two extreme points so far for domestic, we get the decision variable values as:      Duals values:    Partial master obj. value = 318.514 | Objval = 119.9758 | Objval = 53.57 |
| l=3 | Solving the master problem with two extreme points and one extreme direction generated so far for offshore and three extreme points generated so far for domestic, we get the decision variable values as:      Duals values:    Partial master obj. value = 484.8 | \*see note 1  Objval = 0.154 | \*see note 1  Objval = 0.1 |

\*Note 1: The points generated here will not be used at all to recover the optimal solution in terms of the original x variables. It is because we basically detected that these sub-problems do not generate new extreme points and thus their attractiveness price to enhance the current partial master objective function value have a price very close to zero

**Step 3. Stopping. Recovering the values for the original primal variable x’s:**

Remember offshore is an open feasible region and thus the formula has a linear combination of extreme points and also a linear combination of extreme directions. For domestic, the feasible region is closed and then the formula reduces to a linear combination of extreme points or corner points generated

 

Final answer: Optimal number of backpacks produced in mode 1 and mode 2 in offshore site are 20 and 22 and optimal number of backpacks produced in mode 1 and mode 2 in domestic site are 15 and 3.4. The optimal objective function value is 484.8 (see the ascending trend of it over the iterations)

**Your assignment or task: Practice for the second exam by doing Rardin problem 13.12 all and for 13.13 and 13.14 answer questions a-g exactly as asked. For question h use AMPL and do 3 iterations (or less if the stopping condition is reached) of solving restricted master problem and subproblems as taught in class.**