Written narrative of what I want you to do for the class on Thursday (if you can’t finish all you will be doing part of it in-class) to finish to understand the Dantzig Wolfe Decomposition method in a very nice way!

1. Read the hints below and the two whiteboard files worked in-class today
2. Download the very latest files 04/01/2020 206 am files for the model and data for the Master’s at the first iteration and the subproblem model first iteration for the offshore case.
   1. You will need to do a slight modification to have the subproblem model file for the domestic case
   2. Create data files for the subproblems offshore and domestic for the first iteration
   3. Solve Partial master problem and subproblems offshore and domestic for the first iteration and verify all numbers are as in rardin
3. Proceed to update the partial master problem and its data file to be able to produce the results for the second iteration
4. Solve the subproblems for offshore and domestic second iteration. You don’t need new model files, just new data files for each subproblem
5. Repeat steps 2 and 3 for getting the results for the third iteration
6. Why we stop at 3 iterations (read Rardin 841 and 842)
7. Do steps by hand to recover the real values for the x’s in the problem given the linear combinations of extreme points and directions selected in iteration 3. For doing it, it is helpful to read step 3 in algorithm n page 841
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Hints to be successful reproducing the iterations of the Global Backpack example in Rardin and hints to display important things in AMPL that relate to Datzig-Wolfe decomposition

1. Save the problems that relate to the maser in a different folder than the ones that relate to the subproblem
2. How to display the dual of a constraint?

After solving type: display nameofconstraint.dual;

Examples:

ampl: display Shipping.dual;

Shipping.dual = 12.1905

ampl: display Handling.dual;

Handling.dual = 0

ampl: display Convexity.dual;

Convexity.dual [\*] :=

domestic -25.7143

offshore -387.2

1. How to dsiplay the value of a problem decision variable?

After solving type: display name of the decision variable;

Examples:

ampl: display lambda;

lambda :=

domestic 1 0.771429

domestic 2 0.228571

offshore 1 1

;

ampl: display mu;

mu [\*] :=

1 0

;

1. If a problem ends unbounded how to display the extreme direction (i.e. a vector indicating the direction of unboundeness)

After the unbounded problem message is returned type:

Display name of decision variable.unbdd;

Example: dislay x.unbdd;

1. How to display the values for the reduced cost. Here I am exemplifying exactly for the case of global backpack problem at iteration 1. I need to take a part of the objective function formula in the subproblem (i.e. the one that is in parenthesis) and do some edits to ask for the display of the two separate components of the reduced costs vector as follows:

display (profit\_c["one"] - sum{r in LINKING} dual\_var[r] \* A[r,"one"]);

Answer form AMPL:

profit\_c['one'] - sum{r in LINKING} dual\_var[r]\*A[r,'one'] = 11

Similarly,

display (profit\_c["two"] - sum{r in LINKING} dual\_var[r] \* A[r,"two"]);

Answer from AMPL

profit\_c['two'] - sum{r in LINKING} dual\_var[r]\*A[r,'two'] = 7