**LARGE SCALE OPTIMIZATION.**

**SEMESTER Q2, 2017-2018**

**3rd Assignment. Frank Wolfe algorithm**

Each student will find in the assignment list the identification of the data set for his/her assignment.

a. The node-arc incidence matrix of the problem.

b. The link costs vector c will now play the role of a parameter for the volume-delay function

c. The link capacities vector d for assignment 1 will now play the role of a parameter for the volume-delay function.

Volume delay functions on all links will be linear. For link (i,j) the volume-delay function will be:

s*i,j*(x)=c*i,j* + d*i,j*\*x

where c*i,j* , d*i,j* are taken from the corresponding values c,d in the data set.

Pick up at your choice at two origins and at least two destinations and select which o-d pairs will be active in your exercise.

Adapt/Complete the small script (MinCM2.run) in AMPL in order to implement the RSD algorithm with rho=2 using the proper sentences. Once the script file has been completed run it until a relative gap of 0.0005 is found or a maximum of 500 iterations are performed. Complete also the file MinCM2.mod with the necessary definitions if required (new parameters, new constraints, new objective functions etc.), as a base model for the definition of the network constraints for the equilibrium model.

In your report include:

1. A graphical representation of the network.
2. A list in which for each iteration the following information is displayed: a0) the iteration number, a) the objective function value of the equilibrium problem, b) the relative gap, c) the step length obtained in the line search alphas after solving MP at each iteration, d) the number of vertexes used in the iteration, e) the size of the working sets Wx, Ws.
3. A graphical representation of the logarithm of the relative gap versus the iteration number.
4. Alternatively modify conveniently the file MinCM2.mod to solve directly the equilibrium problem with AMPL and compare the solution given by AMPL with that obtained using the F-W method or the RSD algorithm.

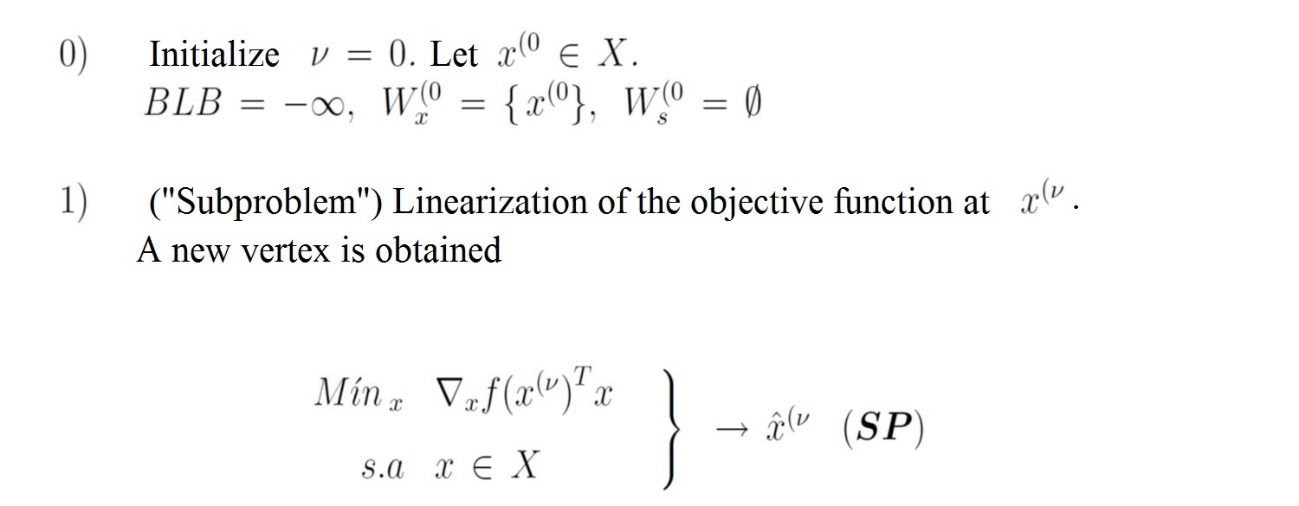
For each o-d pair find two paths and evaluate on them the origin-destination travel costs; are those paths used in the solution?

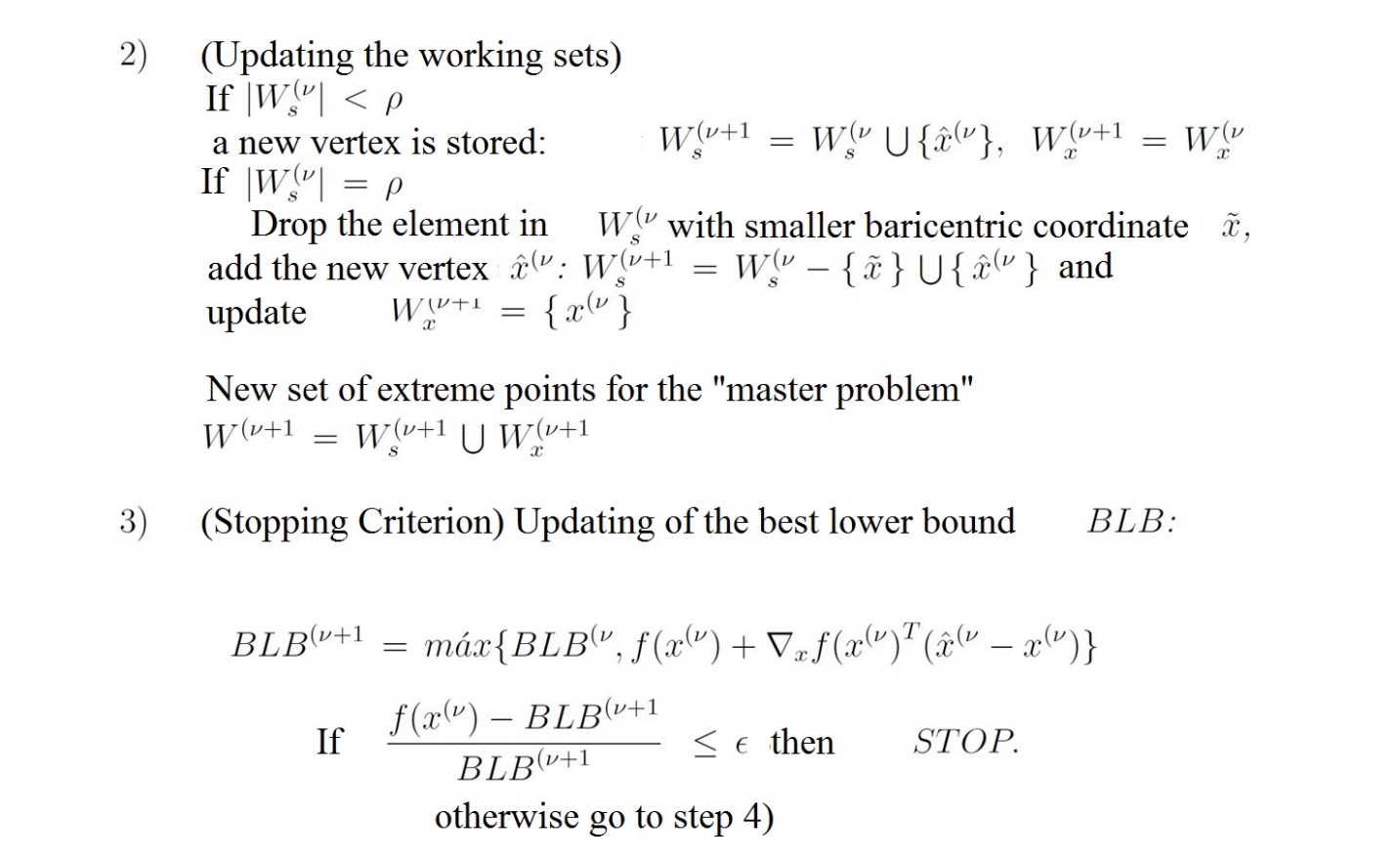
Check costos from origen to destination in two paths. Calculate sum (a pertany a r) r a path p->q, r’ alternative path. We have to prove that have same costs approximately.

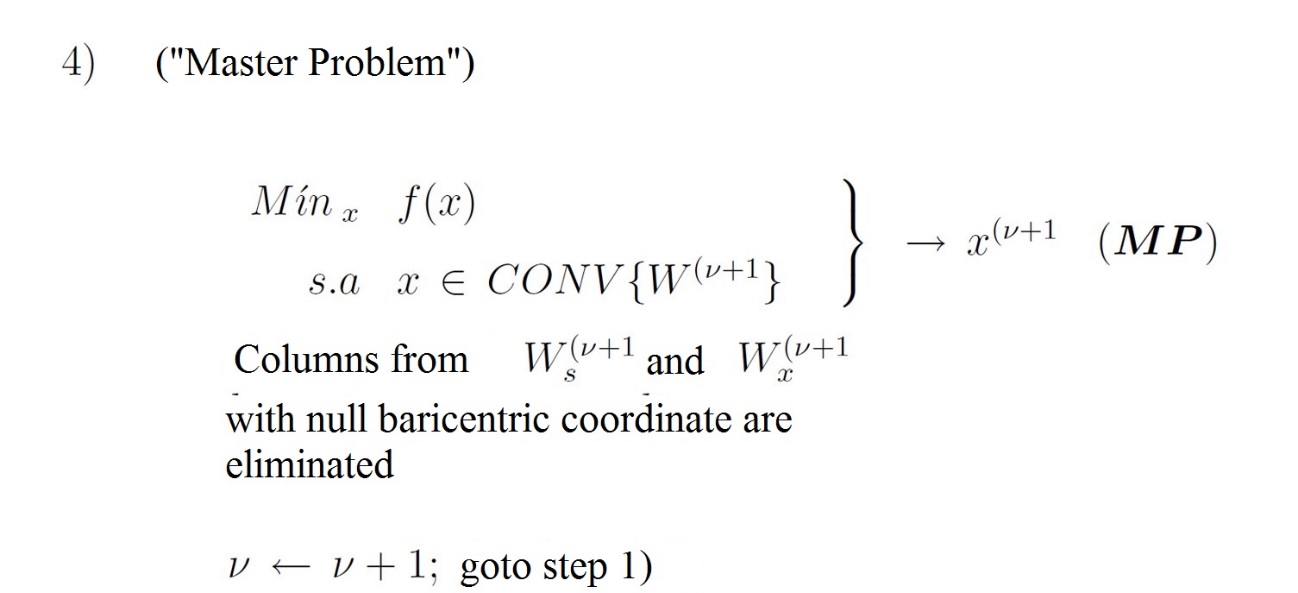
Write a small report including the printout of the iterations, explaining the work done and presenting the results. Include in the delivery the AMPL files used to carry out the exercise.

Send the assignment using the ATENEA platform;

**RESTRICTED SIMPLICIAL DECOMPOSITION (Hearn 1984)**

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