Questions:

ist constraint 11 ok if I just remove x (see report)? I think it should work now. Since I have the set I think this should be fine since for all nodes i inside a specific factory has to be less than the limit for that factory. Regardless if its about to leave or not. This has to be valid for all factories. Right?

Should I move constr. 9 down to bottom asewell?

I think I have found at least logically a good way to represent the matrix based on the distance. If I use your suggested representation (with minor alterations), however instead of using dvs\*cvs in the objective function I use cijv\*dij\*xijv and I add constraint sum(csvdsv) = sum(cijvdijxijv) and an additional constraint for cijv = cklv see 23-24. I am pretty sure this should work. Had to change some parts of the model and changed w with b to make it more consistent with B and so that I could use w for waiting time instead.

Right now I am working on trying to integrate weight into the cost structure. So far I have made the following constraints, I am however unsure of how I can integrate r into the determination of c:

Ar-1avr <= lvr <= Aravr (same type of constraint as for q, not yet writte in but should be fine.)

sum(lvr) >= liv + Qj (see constraint 17)

the last one I thought of since I need lvr to be the greatest weight carried by v, so since it tries to minimize it will always stick to the lowest of those values. I think this should work.

However then I want c to depend on s and r (since its matrix i thought the index should be something like s+(r-1)β where β is the maximum of s. But how do I say for which c the value should be positive.. missing something here would be great with your input.

Practical question: do I need to use another letter than lvr since I already have liv. I mean r and i are different indexes but potentially i could end up with two different l11 l11 if you know what I mean? What do u usually do here? Stick with the same letter or make a new one?

Speed Optimization: I dont think that the speed optimization (solving a subproblem) is relevant to my problem as choosing a route automatically determines the two parameters in the cost matrix and solving which one is optimal (I think) wont save me time and it will only make the problem more complex. There must be a way similar to what I represented now where max weight and distance is given from all x’s for a single vehicle. Changing the order of the x’s or adding/removing x’s will then result in a change in c. My problem with this arrived when I in a subproblem wanted to find a good «speed» or cost element when my x’s are given. Since the x’s for a given solution is given I cannot really optimize anything since distance and weight depend on x (in the speed optimization I understand it so that the speed is independent of where the ship goes)? If you dont understand what I mean.. If not I will explain in our next meeting.