PRP Core Algorithmic Scheme

#Input

S -> Constructed solution

#Parameters

c = 1

lim = 20000

force\_feasible\_search = true

inv\_ops = true

route\_ops = true

inf\_passes = 0;

BestSol ->Local Best Solution

#Algo

#Preparation

if (S is feasible){

inv\_ops = false;

}

shuffleNodeModes();

while(c< lim){

LSMove mv;

if (force\_feasible\_search)

mv = ExploreAllFeasibleOperators(inv\_ops, rout\_ops);

else

mv = ExploreAllOperators(inv\_ops, rout\_ops);

ApplyMove(S, mv);

if (S is feasible AND (Obj(S) < Obj(BestSol)) {

BestSol = S;

inv\_ops = false;

rout\_ops = true;

c = 1;

continue;

}

#Solution Manipulation

#If 1000 iterations go without improvement and we are still in feasible space

#enable infeasible space

if (c % 1000 == 0 AND S is feasible){

setVehCapCoeff(S, selectRandomCoeff());

force\_feasible\_search = true;

inv\_ops = true;

rout\_ops = true;

}

#if 200 iterations go without improvement and we are in infeasible space

#run MIP to try to repair the solution and get back to feasible space

else if (c % 200 == 0 AND S is infeasible){

#Execute MIP to decrease the number of infeasibilities of the solution and also try to optimize it.

runSimultaneousDeliveryProductionReoptimizationMIPVehCapInfeaswithCustInsertionRemovalSameDayRoutes(S);

if (S is feasible)

inf\_passes = 0;

else

inf\_passes += 1;

#if the MIP has failed to repair the solution, do the following steps to aid the algorithm to get back to feasible space (This does not happen that often with the latest MIP)

# 1. Enable feasible only search

# 2. Enable Inventory and Routing operators

# 3. Try to decrease the vehicle capacity coeff

if (inf\_passes == 3) {

decreaseVehCapCoeff(S);

inv\_ops = true;

rout\_ops = true;

force\_feasible\_search = true;

} else if (S is feasible){

setVehCapCoeff(S, 1.0);

if (Obj(S) < Obj(BestSol)) {

BestSol = S;

inv\_ops = false;

rout\_ops = true;

c = 1;

}

}

}

#if 200 iterations go without improvement and we are in feasible space

#run LP to try to repair delivered quantities and TSP solver for fully optimization the routes

else if (c % 200 == 0 AND S is feasible) {

runSimultaneousDeliveryProductionReoptimizationLP(S);

SolveTSP(S);

if (Obj(S) < Obj(BestSol)) {

BestSol = S;

inv\_ops = false;

rout\_ops = true;

c = 1;

}

}

#Every 2000 non improving iterations flip the (saw) modes for a percentage of the customers

if (c % 2000 == 0) {

flipNodeModes(0.2); #Flip mode for 20% of the customers

}

c = c + 1;

}

return BestSol;