Initialize N Particles, N lambda vectors, external archive

Update reference point z, re assign lambda vector to all particles

i<generation\_ limit

j<population\_size

Update par\_j position, velocity

agg(par\_j.position)>

agg(par\_j.pbest\_position)

Update par\_j.pbest

perform local search(update base on aggregation value)

par\_j.non\_Improvement=0

External archive is not full

Add par\_j.pbest to archive

Replace worst particle in archive to par\_j.pbest if par\_j.pbest crowded distance rank higher than the worst one in achrive

non\_improvement=0 if insert succeed else non\_improvement++

par\_j.non\_Improvement++

Par\_j.non\_Improvement>exemplar\_limit

Renew par\_j.exemplar

Return achrive

non\_improvement> exemplar\_limit

Resize all particles, renew all exemplars