NSGA main criticisms:

1. High computational complexity of nondominated sorting
   1. describe a fast nondominated sorting approach which will require N^2 computations instead of N^3
   2. domination count np, the number of solutions which dominate the solution , and 2) Sp, a set of solutions that the solution  dominates.
   3. Ele faz um rank de frentes de Pareto (em camadas)
2. Lack of elitism
3. Need for specifying the sharing parameter
   1. Crowding dist



*c. Crowded-Comparison Operator:* The crowded-compar- ison operator (  ) guides the selection process at the various stages of the algorithm toward a uniformly spread-out Pareto- optimal front. That is, between two solutions with differing nondomination ranks, we prefer the solution with the lower (better) rank.



NSGA-II





O GRANE LANCE ESTA AQUI .... Na juncao dos conjuntos....

R-NSGA-II

**Step 1:** For each reference point, the normalized Euclidean distance of each solution of the front is calculated and the solutions are sorted in ascending order of distance. This way, the solution closest to the reference point is assigned a rank of one.

**Step2:** Aftersuchcomputationsareperformedforallrefer- ence points, the minimum of the assigned ranks is as- signed as the crowding distance to a solution. This way, solutions closest to all reference points are assigned the smallest crowding distance of one. The solutions hav- ing next-to-smallest Euclidean distance to all reference points are assigned the next-to-smallest crowding dis- tance of two, and so on. Thereafter, solutions with a smaller crowding distance are preferred.

**Step 3:** To control the extent of obtained solutions, all solu- tions having a sum of normalized difference in objec- tive values of ε or less between them are grouped. A randomly picked solution from each group is retained and rest all group members are assigned a large crowd- ing distance in order to discourage them to remain in the race.