Deb / Harman / Poli

Genetic and Evolutionary Computation ¿ GECCO 2004

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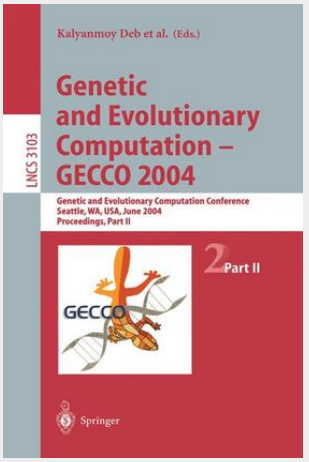

The two volume set LNCS 3102/3103 constitutes the refereed proceedings of the Genetic and Evolutionary Computation Conference, GECCO 2004, held in Seattle, WA, USA, in June 2004. The 230 revised full papers and 104 poster papers presented were carefully reviewed and selected from 460 submissions. The papers are organized in topical sections on artificial life, adaptive behavior, agents, and ant colony optimization; artificial immune systems, biological applications; coevolution; evolutionary robotics; evolution strategies and evolutionary programming; evolvable hardware; genetic algorithms; genetic programming; learning classifier systems; real world applications; and search-based software engineering.

MostMOEAsuseadistancemetricorothercrowdingmethodinobjectivespaceinorder to maintain diversity for the non-dominated solutions on the Pareto optimal front. By ensuring diversity among the non-dominated solutions, it is possible to choose from a variety of solutions when attempting to solve a speci?c problem at hand. Supposewehavetwoobjectivefunctionsf (x)andf (x).Inthiscasewecande?ne 1 2 thedistancemetricastheEuclideandistanceinobjectivespacebetweentwoneighboring individuals and we thus obtain a distance given by 2 2 2 d (x ,x)=[f (x)?f (x)] +[f (x)?f (x)]. (1) 1 2 1 1 1 2 2 1 2 2 f wherex andx are two distinct individuals that are neighboring in objective space. If 1 2 2 2 the functions are badly scaled, e.g.[?f (x)] [?f (x)], the distance metric can be 1 2 approximated to 2 2 d (x ,x)? [f (x)?f (x)]. (2) 1 2 1 1 1 2 f Insomecasesthisapproximationwillresultinanacceptablespreadofsolutionsalong the Pareto front, especially for small gradual slope changes as shown in the illustrated example in Fig. 1. 1.0 0.8 0.6 0.4 0.2 0 0 20 40 60 80 100 f 1 Fig.1.Forfrontswithsmallgradualslopechangesanacceptabledistributioncanbeobtainedeven if one of the objectives (in this casef) is neglected from the distance calculations. 2 As can be seen in the ?gure, the distances marked by the arrows are not equal, but the solutions can still be seen to cover the front relatively well.

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