Indicator-based evolutionary Algorithm

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Outline

- Multi-objective optimization
- IBEA
- Implementation & Tests
- Conclusion

Recombination

Different recombination operators.

Choosing a recombination probability.

Adapting the step-size is essential to find an optimal domain on each dimension.

Fixing the mutation probability

Simulated Binary Crossover

Idea: control the domain of space in which offspring is generated.

Definition: Approximate distribution to a high-probability stationary 'spread' distribution with contracting and expanding distributions

$$c(\beta) = 0.5(n_c + 1)\beta^{n_c}, \beta \leq 1$$

$$e(\beta) = 0.5(n_c + 1)\frac{1}{\beta^{n_c+2}}, \beta > 1$$

$\implies$ Tuning the distribution index.

Thank you!

Questions?

Further Reading I

📄 Eckart Zitzler and Simon Künzli, "Indicator-Based Selection in Multiobjective Search". In Parallel Problem Solving from Nature (PPSN 2004), pp. 832-842, 2004.

📄 Deb, Kalyanmoy, and Ram B. Agrawal. "Simulated binary crossover for continuous search space." Complex Systems 9.3 (1994): 1-15.