

Multi-Objective Evolutionary Algorithms

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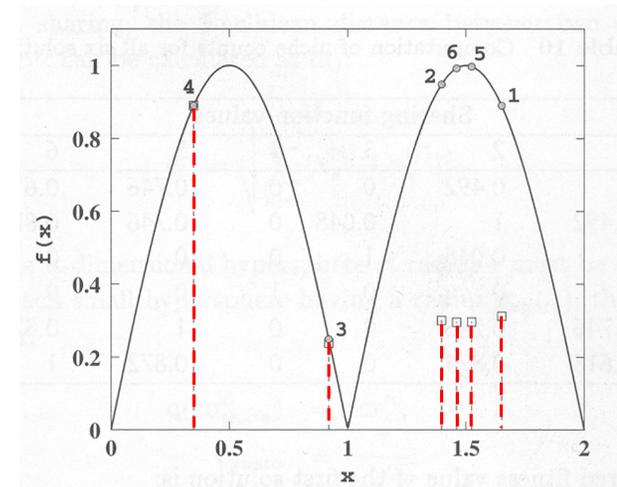
<http://cw.felk.cvut.cz/doku.php/courses/a0m33eoa/start>

Fitness Sharing: Example

Bimodal function - six solutions and corresponding shared fitness functions

- $\sigma_{share} = 0.5, \alpha = 1.$

Sol. i	String	Decoded value	$x^{(i)}$	f_i	nc_i	f'_i
1	110100	52	1.651	0.890	2.856	0.312
2	101100	44	1.397	0.948	3.160	0.300
3	011101	29	0.921	0.246	1.048	0.235
4	001011	11	0.349	0.890	1.000	0.890
5	110000	48	1.524	0.997	3.364	0.296
6	101110	46	1.460	0.992	3.364	0.295



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Let's take the first solution

- $d_{11} = 0.0, d_{12} = 0.254, d_{13} = 0.731, d_{14} = 1.302, d_{15} = 0.127, d_{16} = 0.191$
- $Sh(d_{11}) = 1, Sh(d_{12}) = 0.492, Sh(d_{13}) = 0, Sh(d_{14}) = 0, Sh(d_{15}) = 0.746, Sh(d_{16}) = 0.618.$
- $nc_1 = 1 + 0.492 + 0 + 0 + 0.746 + 0.618 = 2.856$
- $f'(1) = f(1)/nc_1 = 0.890/2.856 = 0.312$

Reading

- Kalyanmoy Deb: Multi-objective optimization using evolutionary algorithms
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