Evolving Sorting Networks Using a Genetic Algorithm

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1 Abstract

This paper describes an exploration of the potential of genetic algorithms to evolve sorting networks.

2 Method Overview

The fitness function I used to evaluate a sorting network was based on the number of swaps away from a correct sort of a test, and based on the length of the genome. I used:

$$1.0/max(swaps\_from\_correct, 0.1)+5.0*(min\_genome\_size)^2)/(length\_of\_genome)^2$$

Where swaps from correct is the number of swaps that was needed to correctly sort the input list after being processed by the sorting network (determined by running merge sort of the post processed list and counting the swaps), min_genome_size is the minimum possible "correct" genome (chosen to be n log(n) where n is the length of the list to be sorted.[1])

[1] Based on my reading, the optimal possible length is some constant factor times n log(n). See http://arxiv.org/abs/1403.2777 for details.