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URL `http://www.genetic-programming.com/gecco2000lbpcomp.ps`

Abstract: Previously reported applications of genetic programming to the automatic synthesis of computational circuits have employed simulations based on DC sweeps. DC sweeps have the advantage of being considerably less time-consuming than time-domain simulations. However, this type of simulation does not necessarily lead to robust circuits that correctly perform the desired mathematical function over time. This paper addresses the problem of automatically synthesizing computational circuits using multiple time-domain simulations and presents results involving the synthesis of both the topology and sizing for a squaring, square root, and multiplier computational circuit and a lag circuit (from the field of control).

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URL `http://www.genetic-programming.com/gecco2000lbpantenna.ps`

Abstract: This paper demonstrates the use of genetic programming to automatically synthesize the design of a wire antenna for an illustrative problem that has been previously solved by both conventional antenna design techniques and the genetic algorithm operating on fixed-length character strings. When the genetic algorithm was used, the human user prespecified many characteristics of the size and shape of the solution. The run of genetic programming also produced a satisfactory result for the illustrative problem. However, it did not require the human user to prespecify the size and shape of the solution. Functions from the Logo programming language and Lindenmayer systems enable genetic programming to draw the antenna. The solution evolved by genetic programming possesses the essential characteristics of the Yagi-Uda type of antenna. The rediscovery by genetic programming of the essential characteristics of the Yagi-Uda antenna is an instance where genetic programming has produced a result that is competitive with a result produced by creative and inventive humans.

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[luke:2000:cgnci] Sean Luke. Code growth is not caused by introns. In Darrell Whitley, editor, *Late Breaking Papers at the 2000 Genetic and Evolutionary Computation Conference*, pages 228–235, Las Vegas, Nevada, USA, 8 July 2000.

URL `http://www.cs.umd.edu/~sean/papers/intronpaper.ps.gz`

Abstract: Genetic programming trees have a strong tendency to grow rapidly and relatively independent of fitness, a serious flaw which has received considerable attention in the genetic programming literature. Much of this literature has implicated introns, subtree structures with no effect on the an individual's fitness assessment. The propagation of inviable code, a certain kind of intron, has been especially linked to tree growth. However this paper presents evidence which shows that denying inviable code the opportunityto propagate actually increases tree growth. The paper argues that rather than causing tree growth, a rise in inviable code is in fact an expected result of tree growth. Lastly, this paper proposes a more general theory of growth for which introns are merely a symptom.

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Abstract: We present an approach for developing parallel distributed implementation of genetic programming (PDIGP) based on exploitation of the inherent parallelism among semi-isolated subpopulations. Proposed implementation runs on cost-efficient configurations of clusters in LAN and/or Internet environment. PDIGP features single global migration broker and centralized manager of the semi-isolated subpopulations, which contribute to achieving quick propagation of the globally fittest individuals among the subpopulations, reducing the performance demands to the communication network, and achieving flexibility of system configurations by introducing dynamically scaling up opportunities. PDIGP exploits distributed component object model (DCOM) as a communication paradigm, which offers generic support for the issues of naming, locating and protecting the distributed entities in PDIGP. Experimentally obtained results show that in some system configurations the computational effort is less than the computational effort in canonical panmictic GP. Analytically obtained and empirically proved results of the speedup of the computational performance indicate that PDIGP features linear, close to ideal characteristics, which, together with the observed reduction of the computational effort contribute to the acquaintance of hyper-linear overall speedup in developed PDIGP.

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