

Paper Submission

Authors are encouraged to submit high-quality, original work that has neither appeared in, nor is under consideration by, other journals.

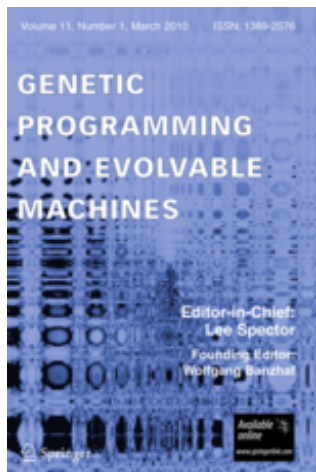
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Important Dates

- Paper submission deadline:
April 30, 2013
- Notification of acceptance:
June 30, 2013
 - Final manuscript:
August 31, 2013

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~Call for Papers~

Special Issue on Evolvability and Robustness in Artificial Evolving Systems

Extended deadline – April 30, 2013

Lee Altenberg, Guest Editor

Associate Editor, *BioSystems*

gpem@physics.org

The journal *Genetic Programming and Evolvable Machines (GPEM)* was founded to focus on artificial evolutionary systems that are *active* — which take inputs from their environment and act on them to produce their behavior.

Short- and long-term evolution depends on the variational properties of the systems - how changes to their structure maps to changes in their behavior (Altenberg, 1994). Robustness and evolvability are key variational properties that themselves show evolutionary dynamics. Active systems are an especially rich domain for the evolution of robustness and evolvability since they often allow for open-ended complexity.

GPEM is calling for papers for a special issue on *Evolvability and Robustness in Artificial Evolving Systems*. A diversity of concepts under the rubrics of 'evolvability' and 'robustness' has been introduced as the literature on these subjects has expanded. This special issue is open to the full range of these concepts.. However, confusion has entered the literature due to imprecise usage of these terms. Therefore, a unique requirement for this special issue will be that the authors provide precise quantitative definitions for the aspects of 'evolvability' and 'robustness' they investigate.

Examples of topics sought include:

- The emergence, or the engineering, of evolvability or robustness into artificial evolutionary systems (AESs);
- New theoretical understanding of the evolution of evolvability, robustness, neutral networks, and their inter-relationships;
- Case studies of the evolution of evolvability, robustness, or neutral networks in AESs;
- Methodology for measuring evolvability and/or robustness;
- Relationships between 1) the robustness of the AES's behavior to variation in inputs and environment, and 2) its robustness under change from the genetic operators (e.g. 'plasto-genetic congruence' Ance and Fontana (2000));
- Mechanisms whereby variational properties of the environment or inputs can shape the variational properties of the AESs under the genetic operators;
- Generalization of the biological concept of *distribution of mutation effects on fitness* to the distribution of genetic operator effects on the objective functions in AESs (Nordin and Banzhaf, 1995).

All enquiries should be sent to Lee Altenberg at: gpem@physics.org. Manuscripts should conform to the standard format stipulated in *GPEM's* Information for Authors. All submissions will be peer reviewed subject to the standards of the journal.

References

- Altenberg, L. 1994. The evolution of evolvability in genetic programming. In Kin-near, K. E., editor, *Advances in Genetic Programming*, pages 47–74. MIT Press, Cambridge, MA.
- Ance, L. W. and Fontana, W. 2000. Plasticity, evolvability and modularity in RNA. *Journal of Experimental Zoology (Molecular and Developmental Evolution)*, 288:242–283.
- Nordin, P. and Banzhaf, W. 1995. Complexity compression and evolution. In Eshelman, L., editor, *Genetic Algorithms: Proceedings of the Sixth International Conference*, pages 310–317, San Francisco. Morgan Kaufmann.



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