

## *Book Review*

*Projection Factorisations in Partial Evaluation.* By JOHN LAUNCHBURY.  
Distinguished Dissertations in Computer Science, Vol. 1. Cambridge  
University Press, 1991. ISBN 0 521 41497 0

The field of partial evaluation is very important because of its potential for fully automatic program optimization, including the automatic generation of compilers from interpreters. Significant progress has occurred since 1984 with a continuing and very productive feedback between theory and computing practice. It has, however, become clear that the subject's theoretical foundations need strengthening, especially as regards its relations to types in programming languages.

John Launchbury's dissertation does just this. It is highly impressive on several grounds:

- It shows a deep insight into a new computer science research area.
- It contains a number of technical innovations and formulations of new concepts relevant to partial evaluation. Many of these involve a high level of mathematical sophistication, e.g. Grothendieck fibrations.
- It has an exceptionally clear presentation of this rather complex mathematical material.
- It has a substantial application aspect as well: he has implemented his mathematical constructions and shown that they perform well in practice. This is all too unusual in our field, in which much work is either entirely theoretical or entirely applied.
- The practical aspect is also clearly presented and evaluated. The results are impressive, demonstrating for the first time the generation of typed residual programs, and the practical usage of Grothendieck fibrations(!).

The writing is unusually lucid, and the typographical layout is pleasing to the eye. An index is provided to aid the reader in finding his or her way among the many levels of mathematical and programming language concepts. In conclusion, this dissertation contains new insights and applications that definitely advance the state of the art of partial evaluation in several respects.

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