RTA–95

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Referee Report Form

Paper Number: 058

Title: Minimal and optimal relative normalization in orthogonal expression reduction systems

Author(s): John Glauert, Zurab Khasidashvili

Please rate the following qualities from 0 to 10, with 10 being the highest.

Technical accuracy:	8
Significance of the work:	7
Originality of the work:	7
Quality of presentation:	6
Appropriateness:	8

Overall evaluation of the paper: 7

[10 – 8] : strong accept
[7 – 6] : weak accept
[5 – 4] : weak reject
[3 – 1] : strong reject
0 – outside the scope of RTA-95

Referee's confidence in the evaluation: 8

Overall evaluation of the paper by the PC member (if different from reviewer):

Justification (why you rate the paper as above):
A nice paper though I have some objections. The paper extends the analysis of Huet-Levy and others regarding needed reductions and optimality in two ways: namely first to a more general framework, of higher-order rewriting using Khasidashvili's ERSs (Expression reduction Systems), second to include more general properties than the normal form property. Both are sensible. As to the first extension (higher-order rewriting) an objection is that ERSs seem less familiar than some other higher-order formats that are defined in recent years and that seem more user-friendly. An objection to the second (more general properties than nf, normal form is that the paper lacks a really convincing example other than the standard ones (e.g. hnf, head normal form). Maybe a good example could be found in the setting of the Interaction Systems of Asperti-Laneve, that combine higher- order rewriting with the constructor discipline. Some of the concepts are not easily grasped or convincing, e.g. in Def.4.2: 'quasi-persistently needed'. A somewhat obscure notion. In Def. 4.3 it is a bit strange that terms are called minimal when they are the endpoint of a minmal reduction, one would expect a definition of this property that refers to the term itself, not to some rewrite sequence leading to it. What I like in this paper is that some neat requirements are isolated that enable one to generalize much classical theory about needeness and optimality to a much larger setting. These concepts are: closed under permutation, closed under needed expansion, and regular (indeed not a good terminology as the authors are aware of themselves). For this reason in my opinion this is a useful paper, with a careful analysis of this theme.

Recommendation to the author(s) for possible improvements:
Thm.2.1, page 5: the notion of st equivalence (with double tilda) seems unexplained. In Abstract: line 2 " sets of normal forms" - this is misleading, change terminology.