Cornell University Library

We gratefully acknowledge support from the Simons Foundation and member institutions

arXiv.org > cs > arXiv:1107.1161

Search or Article-id

(Help | Advanced search)

All papers ▼   Go!

Computer Science > Discrete Mathematics

Locally monotone Boolean and pseudo-Boolean functions

Miguel Couceiro, Jean-Luc Marichal, Tamás Waldhauser

(Submitted on 6 Jul 2011 (v1), last revised 16 May 2012 (this version, v2))

We propose local versions of monotonicity for Boolean and pseudo-Boolean functions: say that a pseudo-Boolean (Boolean) function is p-locally monotone if none of its partial derivatives changes in sign on tuples which differ in less than p positions. As it turns out, this parameterized notion provides a hierarchy of monotonicities for pseudo-Boolean (Boolean) functions. Local monotonicities are shown to be tightly related to lattice counterparts of classical partial derivatives via the notion of permutable derivatives. More precisely, p-locally monotone functions are shown to have p-permutable lattice derivatives and, in the case of symmetric functions, these two notions coincide. We provide further results relating these two notions, and present a classification of p-locally monotone functions, as well as of functions having p-permutable derivatives, in terms of certain forbidden "sections", i.e., functions which can be obtained by substituting constants for variables. This description is made explicit in the special case when p=2.

Submission history

From: Jean-Luc Marichal [view email]
[v1] Wed, 6 Jul 2011 15:30:35 GMT (15kb)
[v2] Wed, 16 May 2012 11:47:52 GMT (17kb)

Which authors of this paper are endorsers?

Link back to: arXiv, form interface, contact.

Download:

- PDF
- PostScript
- Other formats

Current browse context:
cs.DM
< prev | next >
new | recent | 1107

Change to browse by:
cs
math
    math.CO

References & Citations

- NASA ADS

DBLP - CS Bibliography
    listing | bibtex

    Miguel Couceiro
    Jean-Luc Marichal
    Tamás Waldhauser

Bookmark (what is this?)

Science WISE