

Empirical analysis of the convergence of inclusion functions

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In validated computing many techniques are based on more than one inclusion functions. In interval global optimization e.g. one of the main questions is, which inclusion function should be used to get the minimum efficiently. If we use simple interval-arithmetic it can provide larger overestimation but at a lower cost. More sophisticated inclusion functions may give better inclusion, but at the same time they require more computation.

This paper deals with the empirical convergence speed of inclusion functions. According to our earlier experience the natural inclusion for a given function can be at least as good as a usual second-order inclusion function, and although Taylor models are in general only of second-order, they can perform as one of larger order. These facts indicate that convergence order shouldn't be the only indicator of the efficiency of an inclusion function, we need to know in which situation which inclusion function could be used most efficiently. For this reason we have investigated the usual inclusion functions on some test functions. The results will be reported in the talk.

Keywords: interval arithmetic, global optimization, inclusion function, convergence order.