

THE AUTOMATIC COMPUTATION OF SECOND-ORDER SLOPE TUPLES FOR SOME NONSMOOTH FUNCTIONS*

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Abstract. In this paper, we show how the automatic computation of second-order slope tuples can be performed. The algorithm allows for nonsmooth functions, such as $\varphi(x) = |u(x)|$ and $\varphi(x) = \max\{u(x), v(x)\}$, to occur in the function expression of the underlying function. Furthermore, we allow the function expression to contain functions given by two or more branches. By using interval arithmetic, second-order slope tuples provide verified enclosures of the range of the underlying function. We give some examples comparing range enclosures given by a second-order slope tuple with enclosures from previous papers.

Key words. slope tuple, interval analysis, automatic slope computation, range enclosure

AMS subject classifications. 65G20, 65G99

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