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Teaching SIMD computing with a vector forward-mode AD tool

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Teaching is not only an integral part of everyday academic life, but also a key opportunity for academic teaching staff to recruit young scientists.

To that end, illustrative assignments that allow students to actively engage with topics relevant to current research are especially valuable.

We present a classroom-tested assignment for undergraduate students in their sophomore year. In this assignment, students implement a basic operator overloading AD tool that utilizes SIMD instructions for vector forward-mode AD. This AD tool is then employed to solve an optimization problem using a basic gradient-descent algorithm.

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