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Warren L Hare* (warren.hare@ubc.ca), Kelowna, BC V1V 1V7, Canada, and **Gabriel Jarry-Bolduc**. *Calculus of the Simplex Gradient*.

Derivative-free optimization (DFO) is the mathematical study of the optimization algorithms that do not use derivatives. The Simplex Gradient, essentially the gradient of a linear interpolation approximation, is a common tool in DFO. Recent work by Regis extended the definition of the Simplex gradient to include a unified framework for under-determined and over-determined interpolation sets. Regis also introduced a sum-rule and product-rule for the simplex gradient of two functions. Unfortunately, the product-rule only works under a restrictive set of assumptions. In this talk, we review Regis' framework, and product rule. We then provide an alternate product rule, which requires no unreasonable assumptions for application. We introduce a chain rule, and include several corollaries (such as a quotient rule). (Received January 31, 2018)