1145-47-28 **Claudio Cioffi-Revilla*** (`ccioffi@gmu.edu`). *The nabladot operator for integrated calculus of hybrid functions with continuous and discrete variables.*

Science equations sometimes consist of hybrid functions containing both continuous and discrete variables; i.e., so-called "concrete" multivariate functions, in the sense of D. Knuth. Examples include fundamental probability functions for compound events, the binomial probability formula, graph geodesic distance, Amdahl's law, Zipf's law, and various quantum equations, among others. Traditional gradient-based operators from classical multivariate differential calculus and sensitivity analysis are not strictly applicable to a broad class of such functions due to the presence of discrete variables and relatively low-range integer values, such as small cardinalities in the neighborhood of Miller's number, 7 ± 2. The "nabladot" operator for hybrid concrete functions of continuous and discrete variables is proposed and illustrated with examples from diverse domains in the natural, social, and engineering sciences. Results show new features previously unavailable through extant classical analysis and continuous approximations. (Received June 21, 2018)