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Gantumur Tsogtgerel*, 805 Sherbrooke West, Montreal, Quebec H3A 0B9, Canada. *On analysis of discrete exterior calculus*. Preliminary report.

Among the major applications of discrete exterior calculus (in the sense of Hirani et al) are discretization of the Hodge-Laplace operator and various related problems. However, convergence issues for those problems are not completely resolved; as far as we are aware, there is no proof of convergence except for the Poisson equation in two dimensions, which is immediate because the discrete problem is identical to the one that arises from affine finite elements. Moreover, even in two dimensions, there have been some puzzling numerical experiments reported in the literature, apparently suggesting that there is convergence without consistency.

In this talk, I will present an inherently finite difference type theory that is able to partly explain the puzzling experiments, and moreover to establish convergence results beyond the Poisson problem in two dimensions. (Received January 28, 2019)