1086-00-2541 **F. Bonizzoni***, francesca.bonizzoni@epfl.ch, and **F. Nobile** and **A. Buffa**. *Equations for the probabilistic moments of the solution of the stochastic Hodge Laplacian.*

Many natural phenomena and engineering applications are affected by uncertainty in the input data since the data are either incompletely known or contain a certain level of variability. One way to overcome this is to describe the problem data as random variables or random fields, so that the determinist problem turns into a stochastic differential equation (SPDE).

The solution of a SPDE is itself a random field $u(\omega)$ with values in a suitable function space V. The description of this random field requires the knowledge of its m-points correlation $\mathcal{M}^m[u] \in V^{\otimes m}$. An alternative technique to Monte Carlo Method is to derive the moment equations, that is the deterministic equations solved by the probabilistic moments of the stochastic solution. These can be written exactly in the case of a linear problem and stochastic forcing terms.

Given complete statistical information on the random input data, the aim of our work is to compute the statistics of the solution. We take into account the mixed formulation of the Hodge Laplacian with stochastic loading terms. We derive and analyze the moment equations. We find stable tensor product finite element discretizations, both full and sparse, and provide optimal order of convergence estimates. (Received September 25, 2012)