1086-65-175 **Gerard M. Awanou***, University of Illinois Chicago, Chicago, IL 60607-7045, and **Douglas N. Arnold**. *FINITE ELEMENT DIFFERENTIAL FORMS ON CUBICAL MESHES.*

We develop a family of finite element spaces of differential forms de fined on cubical meshes in any number of dimensions. The family contains elements of all polynomial degrees and all form degrees. In two dimensions, these include the serendipity finite elements and the rectangular BDM elements. In three dimensions they include a recent generalization of the serendipity spaces, and new H(curl) and H(div) fi nite element spaces. Spaces in the family can be combined to give finite element subcomplexes of the de Rham complex which satisfy the basic hypotheses of the finite element exterior calculus, and hence can be used for stable discretization of a variety of problems. The construction and properties of the spaces are established in a uniform manner using finite element exterior calculus. We will discuss the characterization of spaces of differential forms which are invariant under translation and scaling. (Received August 03, 2012)