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*Structure Preservation in (Trimmed) Serendipity Finite Element Methods*

Serendipity finite element methods present a promising computational advantage over traditional tensor product finite elements: a significant reduction in degrees of freedom without sacrificing the order of accuracy in the computed solution. The theory of serendipity methods dates back to the 1970s but has seen a resurgence of interest in recent years within the context of finite element exterior calculus and the Periodic Table of the Finite Elements. In this talk, I will focus on the structure preserving properties of serendipity elements and how these properties led us to discover an accompanying space of “trimmed serendipity” elements that are even more computationally efficient. This is based on joint work with Snorre Christiansen and Tyler Kloefkorn.