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Mathematics and Statistics

**Seminars & Colloquium**

**August 25 - 26**

**Colloquium:**

**No Colloquium This Week**

**Monday – August 22**

No Classes

**Tuesday – August 23**

No Classes

**Wednesday – August 24**

No Classes

**Thursday – August 25**

**AppliedMath/Bio-Math Seminar**

Location: MA-010

Time: 4:00-5:00pm

Speaker: Vrushali Bokil - Oregon State University

Topic: Analysis of High Order FDTD Methods for Maxwell's Equations in Dispersive Media

Abstract:

We study the stability properties of, and the phase error present in, several higher-order (in space) staggered finite difference schemes for Maxwellʼs equations coupled with a Debye or Lorentz polarization model.We present a novel expansion of the symbol of finite difference approximations, of arbitrary (even) order, of the first-order spatial derivative operator. This alternative representation allows the derivation of a concise formula for the numerical dispersion relation for all (even-) order schemes applied to each model, including the limiting (infinite-order) case. We further derive a closed-form analytical stability condition for these schemes as a function of the order of the method. Using representative numerical values for the physical parameters, we validate the stability criterion while quantifying numerical dissipation. Lastly, we demonstrate the effect that the spatial discretization order, and the corresponding stability constraint, has on the dispersion error.

**Friday – August 26**

**Algebra Seminar**

Location: MA-115

Time: 4:00-5:00pm

Speaker: Lars Christensen

Topic: Envelopes and Covers I

Abstract:

Approximations of unknown objects by better known ones is recurring theme in applications

of homological algebra within module theory. In these talks I will discuss what it means to approximate efficiently or minimally.