PUBLIC LECTURE

Numerical Solution of Partial Differential Equations with the Finite Element Method

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Abstract

Many problems in engineering and science require the solution of partial differential equations, and most often these equations have no analytical solution. The finite element method is a very general approach to finding approximate solutions to such problems. It is particularly suitable to problems having complicated boundary shapes and discontinuous material properties as often appear in practical engineering problems.

I will explain the fundamentals of the finite element method using some ideas from basic linear algebra, and then show some applications to practical problems. I will also briefly discuss some of the more advanced mathematical aspects of the finite element method.

Speaker Bio

Prof. Kevin Long is an applied mathematician who works on numerical analysis and mathematical modeling with applications to engineering, biology, physics, and astronomy. Some current research projects include simulation of animal migration, algorithms for detection of retinal tumors, algorithms for computational electromagnetism, and simulating the stellar dynamics of dwarf galaxies.

He is currently on the mathematics faculty at Texas Tech University. Before that, he was in the computational mathematics research group at Sandia National Laboratories, on the research staff at Beam Technologies, and on the physics faculty at the State University of New York at Brockport. He has a PhD in astrophysics from Princeton University and a BSc in astronomy from the University of Maryland.

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