Department of Mathematics and Statistics
Colloquium
Tuesday   October 8
AMB 164   4:00 - 5:00 pm

Tricomi's Equation

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Abstract

Tricomi's Equation $u_{xx} + x u_{yy} = 0$ is the simplest partial differential equation one can state that is elliptic on part of its domain, and hyperbolic on another part. Various boundary conditions can be considered in defining the system in such a way as to expect a unique solution. It seems that the equation should be treatable by the numerical technique of using finite differences to define a linear system, and then solving that system. A first attempt at doing so yielded wild results, reminiscent of unstable, extraneous solutions. In applying the separation of variables technique to compute an exact solution to the problem, a series solution from MAT 239 arises. The numerical approximation agrees with the exact solution in several cases with simpler boundary conditions. Further investigation explains the wild solution obtained initially.

Refreshments at 3:45