

# APPLIED MATHEMATICS COLLOQUIUM

Date: Wednesday, February 11, 2015

Time: 2:30 – 3:30 p.m.

Location: Middlesex College Room 204

## **The homotopy analysis method: rigorous proof of convergence and its applications**

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### **Abstract:**

As you may know, although the HAM has been applied to solve so many problems in different fields of science and engineering, rigorous proof of convergence has not been given so far. For general second-order linear differential equations with initial/boundary conditions, we have proved that the series solutions given by the HAM are convergent. Furthermore, an approach for seeking really convergent series solutions to these problems is proposed, which includes the determination of a valid region of the convergence-control parameter for ensuring convergence, and the calculation of an upper bound for the absolute error of a series approximation.