

Francis Austin

Education

BSc, University of New South Wales, Australia

MSc, King's College London, U.K.

PhD, University of Surrey, U.K.

PhD thesis: A vector bundle view of parameter-dependent boundary-value problems.

The PhD thesis investigates the geometric and topological properties of some general classes of eigenvalue problems depending on parameters. In particular, it applies the Chern theory to one class of two-point boundary-value problems that depend on one complex parameter and generalizes the construction of the Garner-Jones vector bundle whose first Chern number is identical to the total number of eigenvalues lying inside the corresponding simple-closed curve in the complex plane that gives rise to that bundle.

Research interests

- synchronization of hyperchaos and complex networks
- applications of differential geometry to differential equations.

Published papers

1. Austin F.R., Wen S., Chen S., Estimation of unknown parameters and adaptive synchronization of hyperchaotic systems, *Communications in Nonlinear Science and Numerical Simulations*, 14 (2009) 4264–4272.
2. Austin F.R., Feng J., Xu C., Feng T., Chaos synchronization between the Genesio system and the unified system, *International Journal of Nonlinear Sciences and Numerical Simulation*, 10 (3), (2009) 373–378.
3. Feng T., Austin F.R., Application of He's max-min approach to a generalized nonlinear oscillator, *World Applied Sciences Journal*, 6 (7), (2009) 1005-1007.
4. Zhang W., Xu C., Austin F.R., Chaos synchronization of the hyperchaotic Chen system with a fractional order, *Journal of Information & Computational Science*, 5:5 (2008) 2201-2208.
5. Gan X., Liu Y., Austin F.R., A prediction method for time series based on wavelet neural networks, *Lecture Notes in Computer Science*, Part II, 3801 (2005) 902 –908.
6. Xu C., Zhang W., Austin F.R., A digital watermarking technique based on wavelet packages, *Lecture Notes in Computer Science*, Part II, 3802 (2005) 649 –654.
7. Austin F.R., Bridges T.J., A bundle view of boundary-value problems: generalizing the Gardner-Jones bundle, *Journal of Differential Equations*, 189 (2003) 412–439.

Accepted papers

1. Guo W., Austin F.R., Chen S., Sun W., Pinning synchronization of complex networks with non-delayed and delayed coupling, *Physics Letters A*, preprint.

2. Guo W., Austin F.R., Chen S., Global synchronization of nonlinearly coupled complex networks with non-delayed and delayed coupling, *Communications in Nonlinear Science and Numerical Simulation*, preprint.

Submitted papers

1. Feng J., He L., Xu C., Austin F.R., Wu G., Synchronization the noise-perturbed Genesio chaotic system by sliding mode control.
2. Li Y., Austin F.R., Chen S., Coexistence of anti-phase and complete synchronization in the generalized Lorenz system.
3. Guo W., Chen S., Austin F.R., Anti-synchronization of complex networks by pinning control.

Conference presentation

“A generalized Gardner-Jones vector bundle” at the “Premier Congrès Franco-Américain de Mathématiques AMS-SMF”, July 2001, Lyon, France.

Current position

Tutor, Department of Applied Mathematics, Hong Kong Polytechnic University
Courses tutored: AMA201, AMA202 Engineering Mathematics I, II
AMA2881 Mathematics for Scientists and Engineers

Research grants obtained

Departmental General Research Funds (March 2009)
Hong Kong Polytechnic University
Project duration: 2 months (July & August 2009)
Grant amount: HK\$ 47,000
Principal Investigator: Francis Austin
Research project: Synchronizing the noise-perturbed Rössler hyperchaotic system via sliding mode control

Research collaborators

- Professor Jian Wen Feng, College of Mathematics and Computational Sciences, Shenzhen University, China
- Professor Shihua Chen, College of Mathematics and Statistics, Wuhan University, China

Hobbies and interests

anything to do with the mountains; music (especially guitar music and drums); astronomy