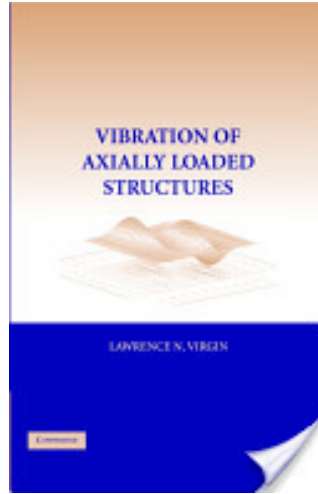




**Professor Lawrence N. Virgin**



L.N. Virgin, *Vibration of Axially Loaded Structures*, Cambridge University Press, 2007

See:

<https://fds.duke.edu/db/aas/math/CNCS/Inv>

<https://mems.duke.edu/faculty/lawrie-virgin>

[https://www.researchgate.net/profile/L\\_Virgin](https://www.researchgate.net/profile/L_Virgin)

<https://scholar.google.com/citations?user=dhkTXx4AAAAJ&hl=en>

Center for Nonlinear and Complex Systems (CNCS)

Mechanical Engineering and Materials Science and Environmental Engineering

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### **Biography:**

Professor Virgin's research is centered on studying the behavior of nonlinear dynamical systems. This work may be broadly divided into two components. First, investigation of the fundamental nature of nonlinear systems based on a mathematical description of their underlying equations of motion. Both analytical and numerical techniques are used with special attention focused on the loss of stability of dynamical systems. The second area of interest is to apply recent results from nonlinear dynamical systems theory to problems of practical engineering importance. These include the nonlinear rolling motion of ships leading to capsize; buckling of axially-loaded structural components; aeroelastic flutter of aircraft panels at high supersonic speeds; vibration isolation based on nonlinear springs; energy harvesting; damage detection and structural health monitoring; and the dynamics of very flexible structures including solar sails and marine risers. Professor Virgin conducts mechanical experiments to complement these studies.

### **Education:**

Ph.D. University of London (UK) 1986

M.S. Cardiff University 1982

B.S. University of Manchester (England) 1981

### **Research Interests:**

Nonlinear Dynamics; Structural Engineering; Aerospace; Chaos, Dynamics; Nonlinear Dynamics; Structural Engineering; Computational Mechanics; Vibration

### **Selected Publications:**

#### **Books:**

L.N. Virgin, Introduction to Experimental Nonlinear Dynamics, Cambridge University Press, 2000

L.N. Virgin, Vibration of Axially Loaded Structures, Cambridge University Press, 2007

#### **Journal Articles:**

L. N. Virgin, "On the harmonic response of an oscillator with unsymmetric restoring force," *Journal of Sound and Vibration*, vol. 126, no. 1, pp. 157–165, 1988.

Plaut, R.H. and Virgin, L.N., "Use of Frequency Data to Predict Buckling," *J. Eng. Mech.*, 116 (10), 2330–2335 (1990).

K.D. Murphy, L.N. Virgin, and S.A. Rizzi. Free vibration of thermally loaded panels including initial imperfections and post-buckling effects: NASA Technical Memorandum 109097. Technical report, NASA, 1994.

K.D. Murphy, L.N. Virgin, and S.A. Rizzi. Characterizing the dynamic response of a thermally loaded, acoustically excited plate. *Journal of Sound and Vibration*, 196:635–658, 1996.

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R. B. Davis, L. N. Virgin, and A. M. Brown. Cylindrical shell submerged in bounded acoustic media: A modal approach. *AIAA Journal*, 46:752–763, 2008.

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