Instructor

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Schedule:

MECH 5505(MCG5355): M, W. 16:06-17:25 Mackenzie Eng. 4236

Lectures Outline:


2. Fundamentals and common characteristics of stability definitions: equilibrium and asymptotic stability; stability in the large; conditional stability; equilibrium and equations of perturbed motion.

3. The direct Liapunov method for autonomous systems: Sylvester’s criterion; Liapunov functions; Liapunov’s theorem of stability; asymptotic stability; theorems of instability; methods to obtain Liapunov functions; applications.

4. Equilibrium states and stationary motions of conservative systems: Lagrange’s Theorem and its invertibility; cyclic coordinates; the Routh transform; stability of stationary motion; applications.

5. Stability in first approximation: general formulation of the problem; theorems of stability in first approximation; Hurwitz’s criterion; applications.

6. Linear autonomous systems: matrices and matrix operations; elementary divisors; stability of autonomous linear systems; stability of resonance.

7. Direct Liapunov method and stability of control systems: governing differential equations of perturbed motion of automatic control systems; canonical equations of perturbed motion; Liapunov functions; absolute stability.

8. The frequency method of stability analysis: transfer functions and frequency characteristics; Nyquist stability criterion; nonlinear systems; applications.
Suggested References: (on reserve at Carleton University Library)

4. Introduction to Dynamics and Control, by: Leonard Meirovitch, John Wiley and Sons, 1985

Course Evaluation:

Assignments:----------------------------------------------------------10%

Midterm Examination:------------------------------------------30%
Open Notes
Wednesday Feb12, 2014

Final Examination:------------------------------------------60%
As scheduled by Examinations Scheduling Office or determined by general consensus of the class

Notes:

• The final examination is for evaluation purposes only and will not be returned to students.
• Assignment problems will be collected at the end of the term and evaluated at that time.
• Assignment problems will be posted on the web

Academic Accommodation

You may need special arrangements to meet your academic obligations during the term. For an accommodation request the processes are as follows:

Pregnancy obligation: write to me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details visit the Equity Services website: http://www2.carleton.ca/equity/

Religious obligation: write to me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details visit the Equity Services website: http://www2.carleton.ca/equity/
Academic Accommodations for Students with Disabilities: The Paul Menton Centre for Students with Disabilities (PMC) provides services to students with Learning Disabilities (LD), psychiatric/mental health disabilities, Attention Deficit Hyperactivity Disorder (ADHD), Autism Spectrum Disorders (ASD), chronic medical conditions, and impairments in mobility, hearing, and vision. If you have a disability requiring academic accommodations in this course, please contact PMC at 613-520-6608 or pmc@carleton.ca for a formal evaluation. If you are already registered with the PMC, contact your PMC coordinator to send me your Letter of Accommodation at the beginning of the term, and no later than two weeks before the first in-class scheduled test or exam requiring accommodation (if applicable). After requesting accommodation from PMC, meet with me to ensure accommodation arrangements are made. Please consult the PMC website for the deadline to request accommodations for the formally-scheduled exam (if applicable) at http://www2.carleton.ca/pmc/new-and-current-students/dates-and-deadlines/