

18.354J Nonlinear Dynamics II: Continuum Systems

Spring 2014 – Course Info

Lectures: MW 3-4:30 in E17-128
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1.	W	Feb	5	Introduction & Kepler's Laws	
2.	M	Feb	10	Random walkers	
3.	W	Feb	12	Diffusion equation: Fourier method	
	M	Feb	17	— PRESIDENTS DAY —	
4.	T	Feb	18	Diffusion equation: Green's function method	
5.	W	Feb	19	Diffusion equation: Applications	
6.	M	Feb	24	Towards hydrodynamics	PS1 due
7.	W	Feb	26	Navier-Stokes equations	
8.	M	Mar	3	Impulsively moved boundary (Stokes' 1st probl.)	
9.	W	Mar	5	The coffee cup	
10.	M	Mar	10	Dimensional analysis	PS2 due
11.	W	Mar	12	Scalings	
12.	M	Mar	17	Calculus of variations	
13.	W	Mar	19	Surface tension	
	MW	Mar	24-28	— SPRING VACATION —	
14.	M	Mar	31	Elasticity	Proposal & PS3 due
15.	W	Apr	2	Deformation of a thin beam	
16.	M	Apr	7	Singular perturbations	PS4 due
17.	W	Apr	9	Towards airplane flight	
18.	M	Apr	14	Classical airfoil theory I	
19.	W	Apr	16	Rotating flows	Mid-term Posted
	M	Apr	21	— MIT HOLIDAY (PATRIOTS DAY) —	
20.	W	Apr	23	Ekman layer and spin-down	Mid-term due on April 25
21.	M	Apr	28	Hydrodynamic instabilities (overview)	
22.	W	Apr	30	Solitons	
23.	M	May	5	Active Matter I	
24.	W	May	7	Active Matter II	
25.	M	May	12	Final projects: student presentations	
26.	W	May	14	Final projects: student presentations	Project report due