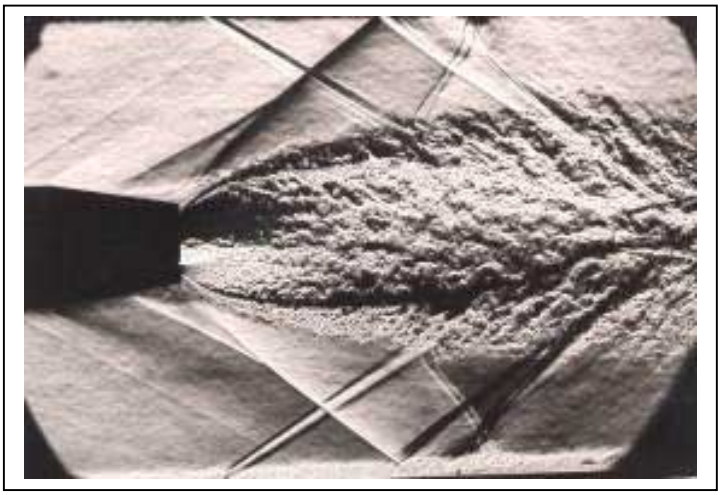
AEROSPACE 412 Spring semester

TURBULENT FLOW



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TOPICS

Introduction,course outline
Properties of turbulent flows, the origins of turbulence

Turbulent diffusion, effect of length and time scales
Eddy diffusivity

Dimensional analysis, Kolmogorov microscales

Cartesian tensors, notation, operations, summation convention

Equations of motion, continuity, momentum and energy, Reynolds stresses

Mixing length hypothesis, kinetic theory, Prandtl's model,scaling

Dynamics of turbulence, kinetic energy, turbulent transport
Energy associated with fluid motion, energy transfer

Vorticity, vortex stretching, vorticity transport

Free shear flows, thin shear layer equations, momentum integral
Self preservation, wake, plane jet, energy budget

Bounded shear flows, surface layers, channel flow, pipe flow

Statistical analysis

Turbulence modelling for engineering flows

Grading

Homework assignments	% 30
Mid-term examination	% 20+20
Final Examination	% 30

Class notes will be distributed

Tennekes & Lumley
A First Course in Turbulence, MIT Press 1974
will be available on reserve in Engineering Library