

## Midterm #3

Chapt. 12 & Chapt 13.1, 13.2, 13.5

### Chapt. 12 (Laminar Boundary Layers)

- What are the physical attributes
- How are the Navier-Stokes eqns. simplified (steady, 2D)
- "Boundary Layer Approximations"
- Blasius Solution.
  - how to interpret variables (transform to/from similarity & physical variables)
  - predictions of  $\tau_w$ ,  $F$ ,  $\delta$   
how  $\tau_w$  &  $\delta$  vary along the surface
- Integral Boundary Layer Eqs.
  - understand basic integral eqn.
  - $S_z$ ,  $S$ , physical meaning
  - apply flat plate solution

### Chapt. 13

- 13.1 - concept of Reynolds decomposition
- 13.2 - averaged N-S eqn. with turbulence term (understand role of fluctuating velocity on mean momentum).
- 13.5 - application of power law velocity profile to obtain wall stress distribution.
  - Laminar starting region.