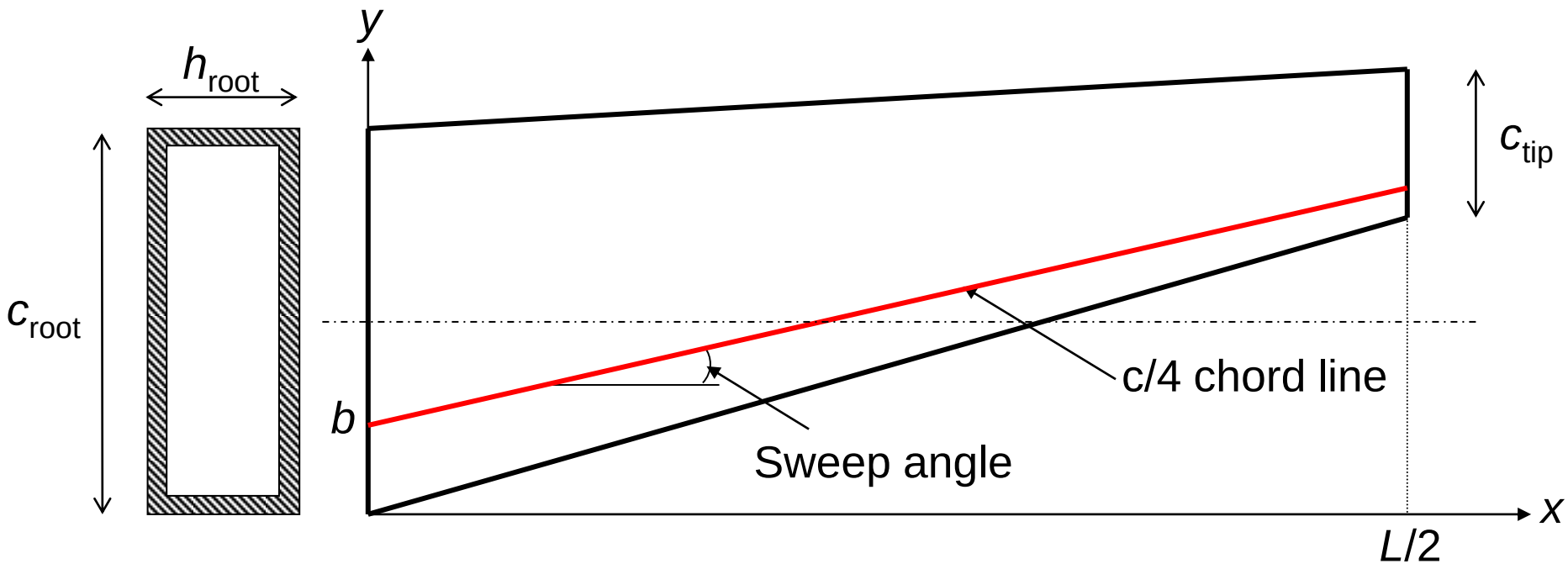
Project: Wing-Box Analysis

- Objective: to estimate stresses at the root of a wing and determine the safety of the wing using failure criteria



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- Load estimation
  - The lift, w, over the surface of the entire wing is replaced by a line load (lift per unit length) elliptically distributed along c/4 line
  - Total lift = airplane weight * load factor
- Modeling
  - Cantilevered beam with thin-walled rectangular cross section (c_{root} X h_{root})

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- Analysis
  - Bending moment, shear force, and torque
  - Calculate stress using formulas in Chapter 3, 4, 5
- Failure prediction
  - Find material properties and failure strength of Aluminum 7075-T3
  - Calculate maximum von Mises stress at the root
  - Calculate safety factor (failure strength/von Mises stress)

Project: Wing-Box Analysis

- Individual project
- Online submission (Project1_SortNo.doc(pdf))
- Report must explain step-by-step procedure with equations, figures, and/or tables
- Will check plagiarism
- Due date: Starting class of Nov. 11^{th}