

truss  
 analysis

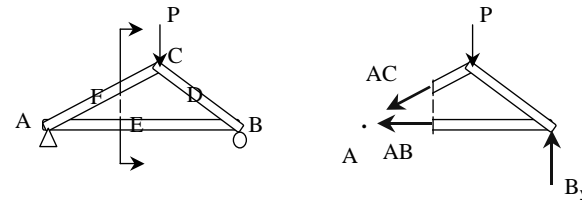


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Method of Sections

- relies on internal forces being in equilibrium on a section
- cut to expose 3 or less members
- coplanar forces  $\rightarrow \sum M = 0$  too



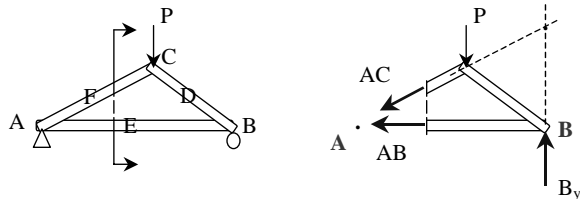
Trusses 10

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Method of Sections

- joints on or off the section are good to sum moments
- quick for few members
- not always obvious where to cut or sum



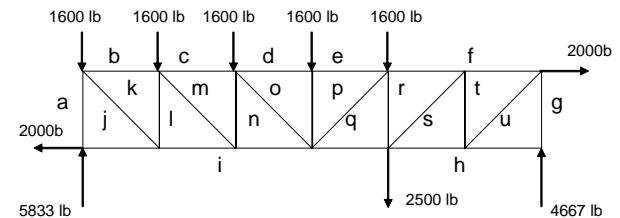
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Graphical Analysis

- lettering rules (Bow's notation)
- draw a force polygon of known loads and reaction forces



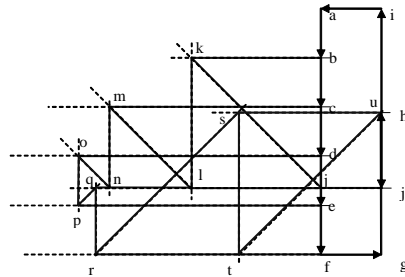
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## Graphical Analysis

- draw reference directions for members and find intersections
- measure and determine  $C$  or  $T$
- follow steps!
- learn by example



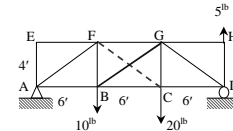
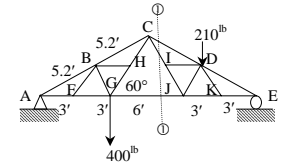
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## Other Trusses

- compound truss
  - simple trusses with more links
  - might have pins in middle of members
- statically indeterminate
  - too many members
  - constrained
  - diagonal tension counters



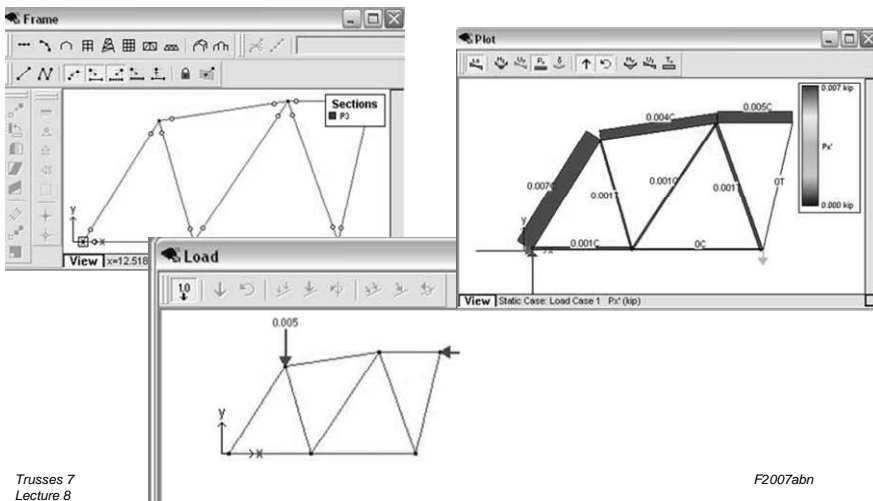
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## Tools – Multiframe4D

- in computer lab

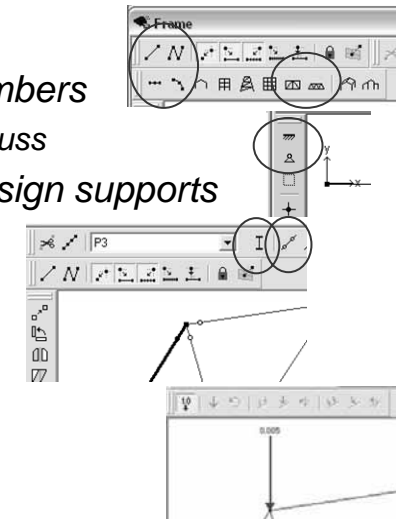


Trusses 7  
Lecture 8

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## Tools – Multiframe4D

- frame window
  - define truss members
    - or pre-defined truss
  - select points, assign supports
  - select members, assign section & assign pin ends
- load window
  - select points, add point load



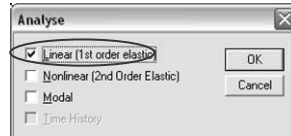
Trusses 8  
Lecture 8

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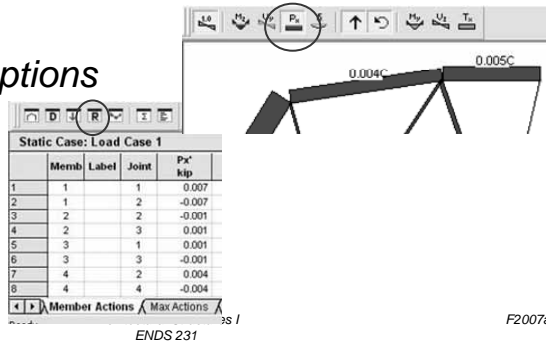
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# Tools – Multiframe4D

- to run analysis choose
  - case menu
    - Analyse...
      - Linear (1<sup>st</sup> order elastic)



- plot
  - choose options
- results
  - choose options



| Static Case: Load Case 1 |       |       |       |           |
|--------------------------|-------|-------|-------|-----------|
|                          | Membr | Label | Joint | Px<br>kip |
| 1                        | 1     |       | 1     | 0.007     |
| 2                        | 1     |       | 2     | -0.007    |
| 3                        | 2     |       | 2     | -0.001    |
| 4                        | 2     |       | 3     | 0.001     |
| 5                        | 3     |       | 1     | 0.001     |
| 6                        | 3     |       | 3     | -0.001    |
| 7                        | 4     |       | 2     | 0.004     |
| 8                        | 4     |       | 4     | -0.004    |