Two-Force Members

Steven Vukazich
San Jose State University
Notes Regarding Two-Force Members

• Identifying two-force members in statics analysis is not strictly necessary;
• Identifying two-force members is usually advantageous as it often simplifies the analysis and reduces the possibility of making errors;
• Look for members that satisfy the following:

1. Members whose weight is negligible,
2. Members connected by exactly two pin connections,
3. Members with no applied loading between connections.
Exactly Two Forces Applied to the Member

\[ F_A \quad F_B \]
4 Unknowns
3 Independent Equations of Equilibrium
Satisfy Moment Equilibrium about Point A

\[ F_A + F_B + \sum M_A = 0 \]
Satisfy Moment Equilibrium about Point B
We can define our coordinate system to line up with AB.
Two possibilities for Equilibrium for Two-Force Members

The only unknown remaining is the magnitude of the force
Note that the shape of the two-force member does not change the result.
Braces in frames to resist seismic loads are often idealized as two-force members.

Brace in compression

Brace in tension