Chapter 6.6: Moment Distribution Method
“Moment Distribution Method”

1. Stiffness, $K$ – the amount of force/moment necessary to produce a unit displacement/rotation.

   Absolute Stiffness = $\frac{4EI}{L}$ *Prismatic

   Relative Stiffness = $\frac{I}{L}$

   * $K$ for overhang is always zero
“Moment Distribution Method”

2. Distribution Factor, $DF$ – a value which determines the appropriate amount of moment to be distributed to a member.

\[
DF = \frac{K}{\sum_{jt} K}
\]

Where: $K$ – stiffness of the member

$\sum_{jt} K$ – sum of stiffness of all members meeting at a joint

* $DF$ for hinge/roller = 1, for fixed support = 0
“Moment Distribution Method”

3. Carry-Over Factor, **COF**

   For prismatic members: **COF = 1 / 2**

4. Fixed-End Moments, **FEM** – moments developed at the ends of a member due to applied loads considering the beam is fixed at both ends.

   *For overhangs: No need to assume fixed End*

5. Distributed Moment, **DM**

   \[
   DM = (\sum_j t_j M)(-DF)
   \]

   \[
   CO = \frac{1}{2} (DM)
   \]

   \[
   FM = \sum FEM + \sum CO + \sum DM
   \]

   *Counterclockwise positive*
“Fixed-End Moments (FEM)”

\[ \omega \frac{L^2}{12} + \omega \frac{L^2}{12} \]

*Sign Convention: Counterclockwise Positive*
“Fixed-End Moments (FEM)”

Sign Convention: Counterclockwise Positive

\[ +\frac{Pab^2}{L^2} \quad \text{and} \quad -\frac{Pa^2b}{L^2} \]
“Fixed-End Moments (FEM)”

*Sign Convention: Counterclockwise Positive

\[ +\omega L^2/30 \quad -\omega L^2/20 \]
“Fixed-End Moments (FEM)”

→ Use Double-Integration Method to get FEM

*Sign Convention: Counterclockwise Positive
Example 1:

Determine the reactions at the supports.
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