MOMENT DISTRIBUTION PROCEDURE
CE 131 — Theory of Structures

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Moment distribution is a process of successively locking and unlocking joints to balance and equilibrate moments in statically indeterminate beams and frames.

1. Identify the joints in the beam.

2. At every joint, compute the total bending stiffness, K_t. $K_t = \sum K_i$

Far End Fixed:	$K_i = 4EI/L$
Far End Pinned:	$K_i = 3EI/L$

3. At every joint, compute the distribution factors (DF) for each span.

   $$DF = K_i/K_t$$

   K_t = total bending stiffness at the joint.
   Ki = contribution to K_t from member "i"

Fixed Joint:	$DF = 0$	K_t = infinity
Pinned Joint:	$DF = 1$	no other members.

4. Compute the Fixed End Moments.

5. Write the DF's on a horizontal line below each joint of the beam.

6. Write the fixed end moments for each span below the DF's.

7. Moment Distribution Process:

   (a) Find the moment to put a joint into equilibrium.

   (b) Apply this moment to the joint (i.e., release the joint) by distributing this moment according to the DF's

   (c) Distribute a fraction of these moments to the far-end joints.

Far End Fixed:	Carry-Over Factor = 1/2
Far End Pinned:	Carry-Over Factor = 0

   (d) Go to the next joint with an unbalanced moment and iterate until convergence.