

1.6 Mobility (con't.)

A 1-DOF joint (*e.g.* pin or slider) has 2 constraints (show example)

A 2-DOF joint (*e.g.* pin-slot) has 1 constraints (show example)

MOBILITY is given by the KUTZBACH CRITERION:

$$m = 3(n - 1) - 2j_1 - j_2 \quad \text{where } j_1 = \# \text{ 1 DOF joints}$$

$$j_2 = \# \text{ 2 DOF joints}$$

If you only have 1-DOF joints (pin joints and sliding joints, for example), then

$$j_2 = 0$$

For **unit mobility** ($m = 1$, or 1 DOF), from the KUTZBACH CRITERION you get:

$$1 = 3n - 3 - 2j_1$$

$$3n = 4 + 2j_1$$

$$n = \frac{4 + 2j_1}{3}$$

must be integer (number of links)

j_1	n	
4	4	→ 4-bar linkage with 4 pin or slider joints is simplest planar mechanism
5	-	
6	-	
7	6	→ 6-bar linkage with 7 pin or slider joints also has 1 DOF, but more complex (see text Fig. 1.19)

1.7 Classification of Mechanisms

Lots of clever ones...please look through the section:

- Ratchets & Escapements
- Indexing Mechanisms (Geneva stop...we'll analyze this later)
- Curve Generators
- Straight-Line Generators (you have one for homework)