

FRAMES

TYPES OF FRAMES

Though there are many types of frames, yet from the analysis point of view, the frames may be classified into the following two groups:

1. Perfect frame.
2. Imperfect frame.

PERFECT FRAME

A perfect frame is that, which is made up of members just sufficient to keep it in equilibrium, when loaded, without any change in its shape.

$$n = (2j - 3)$$

n = No. of members, and
 j = No. of joints.

IMPERFECT FRAME

An imperfect frame is that which does not satisfy the equation :

$$n = (2j - 3)$$

Or in other words, it is a frame in which the no. of members are *more* or *less* than $(2j - 3)$. The imperfect frames may be further classified into the following two types :

1. Deficient frame.
2. Redundant frame.

DEFICIENT FRAME

A deficient frame is an imperfect frame, in which the no. of members are less than $(2j - 3)$.

REDUNDANT FRAME

A redundant frame is an imperfect frame, in which the no. of members are more than $(2j - 3)$.

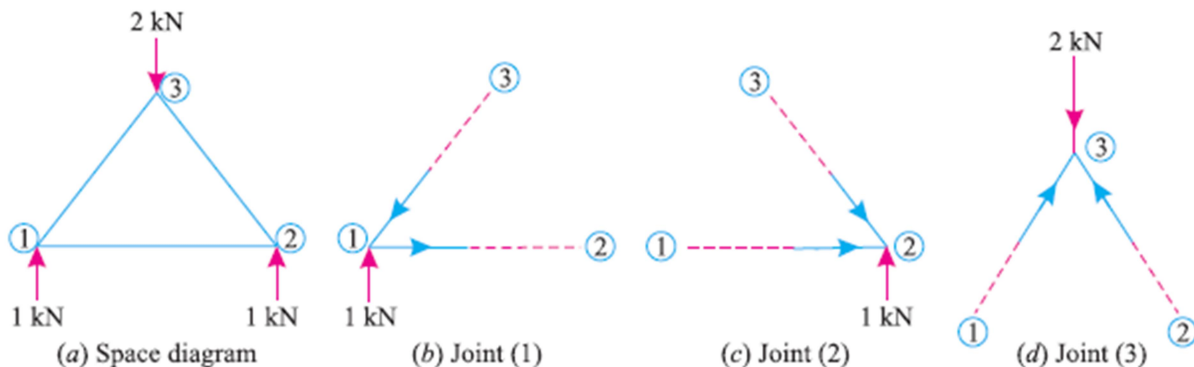
ANALYTICAL METHODS FOR THE FORCES

The following two analytical methods for finding out the forces, in the members of a perfect frame, are important from the subject point of view :

1. Method of joints.
2. Method of sections.

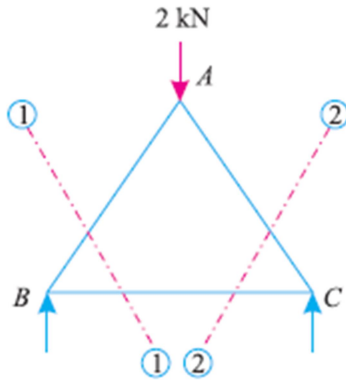
METHOD OF JOINTS

In this method, each and every joint is treated as a free body in equilibrium as shown in Fig. (a), (b), (c) and (d). The unknown forces are then determined by equilibrium equations i.e Sum of all the vertical forces and horizontal forces is equated to zero.

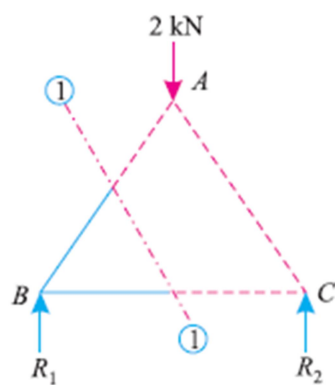


METHOD OF SECTIONS

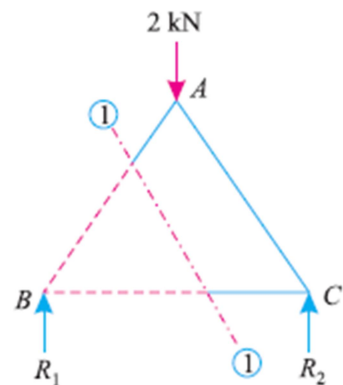
This method is particularly convenient, when the forces in a few members of a frame are required to be found out. In this method, a section line is passed through the member or members, in which the forces are required to be found out as shown in Fig. A part of the structure, on any one side of the section line, is then treated as a free body in equilibrium under the action of external forces as shown in Fig. The unknown forces are then found out by the application of equilibrium or the principles of statics.



(a) Space diagram



(b) Left part



(c) Right part