PRINCIPLE of SUPERPOSITION
SUPERPOSITION

The principle states that for an elastic body subjected to many forces acting simultaneously, then the effect of each one of the loads at a given point is the algebraic sum of the individual efforts of each one of the loads at that point separately

The principle is however valid if:

(a) the stresses are within elastic limit

(b) the deflection does not affect the applied loads.

(c) the structural stability is not affected

Problems involving superposition principle are usually solved through drawing free body diagrams (fbd)

Free body diagram

If a structure (Figure 1) is in equilibrium under the action of applied loads, any part of the the structure must also be in equilibrium. We can thus, in our imagination, isolate any portion from that structure (Figure 2). This isolated portion under the applied loads on it and the internal forces in the cut members, shall then be in equilibrium.

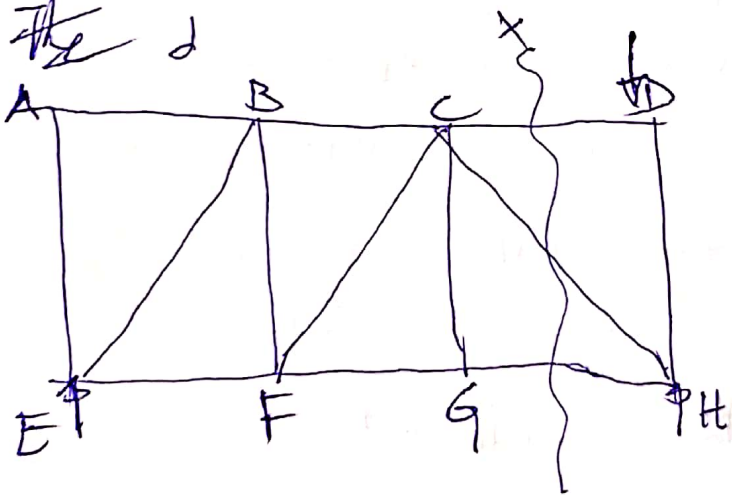

Figure 1

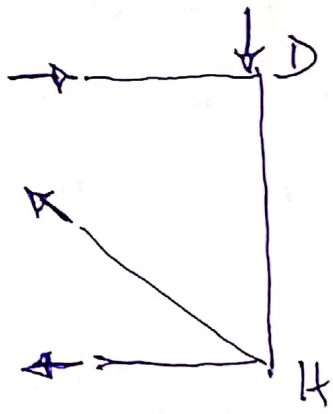

Figure 2

The freebody diagram is the diagram showing an isolated portion of a structure together with the forces acting on it, both internal and external as well.

Examples