➔ A linear multi-point constraint requires that a linear combination of nodal variables is equal to zero; that is, $A_1 u_i^P + A_2 u_j^Q + \cdots + A_N u_k^R = 0$, where u_i^P is a nodal variable at node *P*, degree of freedom *i*; and the A_n are coefficients that define the relative motion of the nodes.

➔ To illustrate this behavior, consider a spring-supported beam subjected to a concentrated load as shown in fig-1. The static reaction forces are $R_y^C = -3$ and $R_y^D = -6$. In Fig-2 the same structure is subjected to the additional linear constraint equation $u_y^A - u_y^B = 0$, which constrains the beam to remain horizontal. This introduces constraint forces $F_y^A = 1.5$ and $F_y^B = -1.5$, and the new reaction forces are $R_y^C = R_y^D = -4.5$. These reaction forces produce a global force balance in the Y-direction, but since the constraint forces are not included in reaction force output, the global moment balance about point A cannot be verified.

Figure -1 Beam with no linear constraints.

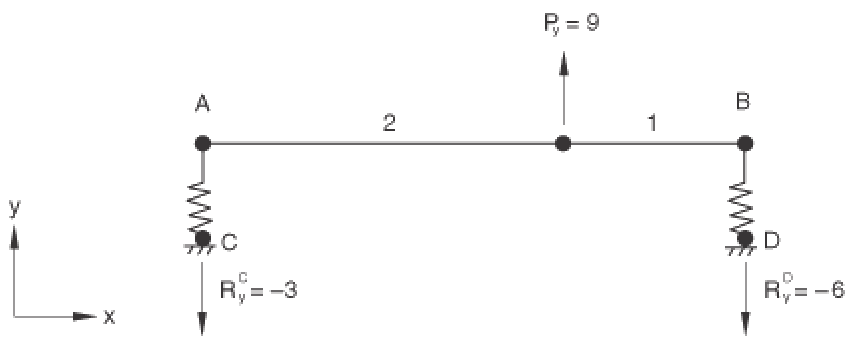

Figure -2 Beam with linear constraint $u_y^A - u_y^B = 0$. Constraint forces F_y^A and F_y^B are not included in reaction force output.