"The CM of a system of particles moves as if the entire mass of the system is concentrated at it and all the external force are acting on it".

Principle of conservation of velocity of CM :

if $\vec{v}$ = const $\Rightarrow \vec{a} = 0$

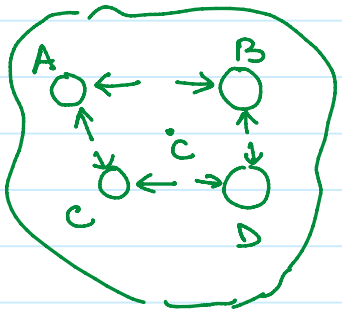
by Eq (5), if $\vec{F}_{ext} = 0$ then by Eq (5).

$$M\vec{a}_{cm} = 0$$

$\because M \neq 0 \Rightarrow \vec{a}_{cm} = 0$

$\Rightarrow \vec{V}_{cm}$ = const

i.e "if the net ext. force acting on a system is zero, then velocity of CM of the system remains conserved"



$(v_{cm})_{initial} = 0$.

$(v_{cm})_{final} = 0$