

A line segment connects point A to point B. Point A is at the bottom left and point B is at the top right.

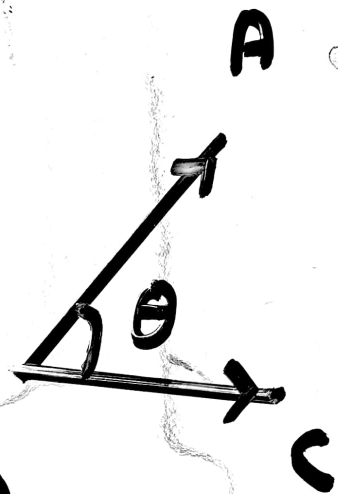
A  $(x_1, y_1, z_1)$

B  $(x_2, y_2, z_2)$

$$AB = \sqrt{\Delta x^2 + \Delta y^2 + \Delta z^2}$$

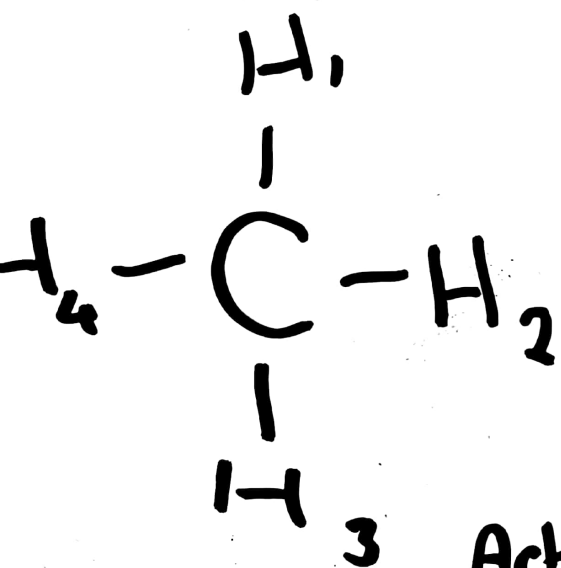
$$\overrightarrow{BA} = \vec{a} - \vec{b}$$

$$\overrightarrow{BC} = \vec{c} - \vec{b}$$



$$\overrightarrow{BA} \cdot \overrightarrow{BC} = |\overrightarrow{BA}| |\overrightarrow{BC}| \cos \theta$$

$$\therefore \theta = \cos^{-1} \left( \frac{\overrightarrow{BA} \cdot \overrightarrow{BC}}{|\overrightarrow{BA}| |\overrightarrow{BC}|} \right)$$



All possible combinations:

$\text{CH}_1$   
 $\text{CH}_2 \text{ H}_1 \text{H}_2$   
 $\text{CH}_3 \text{ H}_1 \text{H}_2 \text{ H}_2 \text{H}_3$   
 $\text{CH}_4 \text{ H}_1 \text{H}_2 \text{ H}_2 \text{H}_3 \text{ H}_3 \text{H}_4$

Total combinations:  $\frac{N(N-1)}{2}$

3 Actual Bonds:

$\text{CH}_1$   
 $\text{CH}_2$   
 $\text{CH}_3$   
 $\text{CH}_4$

Atoms bonded if:

$\left. \begin{array}{l} \text{CH}_1 \\ \text{CH}_2 \\ \text{CH}_3 \\ \text{CH}_4 \end{array} \right\} \text{bond length} \leq (r_1 + r_2) \times 1.2$