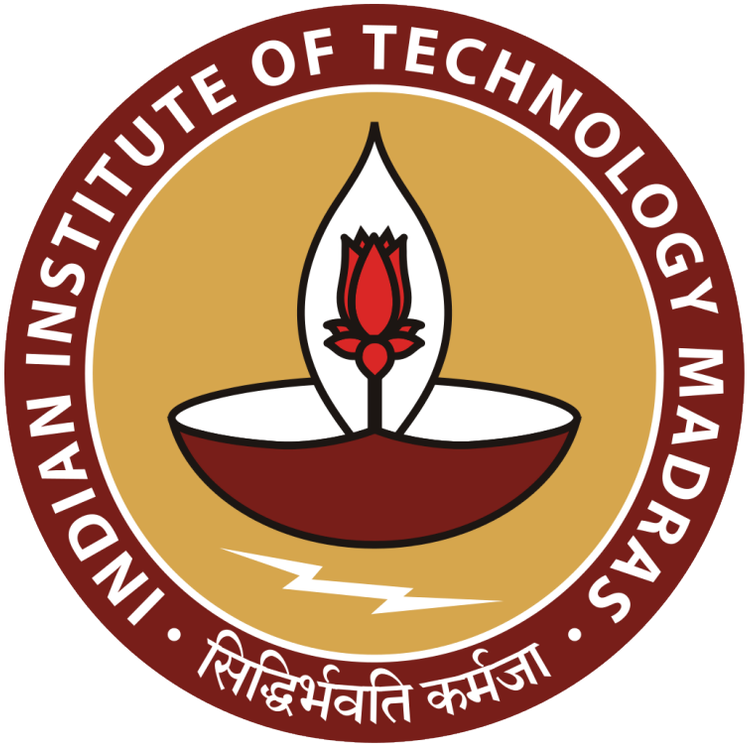

IIT Madras

ONLINE DEGREE

Examples

Question. Show that the two lines $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$, $b_1, b_2 \neq 0$ are

- parallel if $a_1b_2 = a_2b_1$, and
- perpendicular if $a_1a_2 + b_1b_2 = 0$.

Using Slope-intercept form,

$$m_1 = -\frac{a_1}{b_1} \text{ and } m_2 = -\frac{a_2}{b_2}$$

If the lines are parallel, then $a_1b_2 = a_2b_1$.

If the lines are perpendicular, then $a_1a_2 + b_1b_2 = 0$.

Two non-vertical lines l_1 and l_2 are parallel if and only if their slopes are equal.

Two non-vertical lines l_1 and l_2 are perpendicular if and only if $m_1m_2 = -1$