$$\frac{^{n+1}C_0 \quad ^{n+1}C_1 \quad ^{n+1}C_2 \quad \cdots \quad ^{n+1}C_n \quad \boxed{^{n+1}C_{n+1}}}{^{n}C_0 \quad ^{n}C_1 \quad ^{n}C_2 \quad ^{n}C_3 \quad \cdots \quad ^{n}C_n}$$

$$\prod_{r=0}^{n} \frac{^{n+1}C_r}{^{n}C_r} = \prod_{r=0}^{n} \frac{n+1}{(n+1-r)} = \frac{(n+1)^{n+1}}{(n+1)!}$$

$$(n+1)(n)(n-1)\cdots 1$$

Ex-II $\longrightarrow$ $\underline{14 - (iii)}$

Ex-III $\left(\longrightarrow 4, 5 \right)$

Ex-IV $\longrightarrow$ 6 ✓

Conic Section

fixed point (focus)

fixed line (directrix)

is Constant (eccentricity)

(focus) S

P

(directrix) $L = 0$
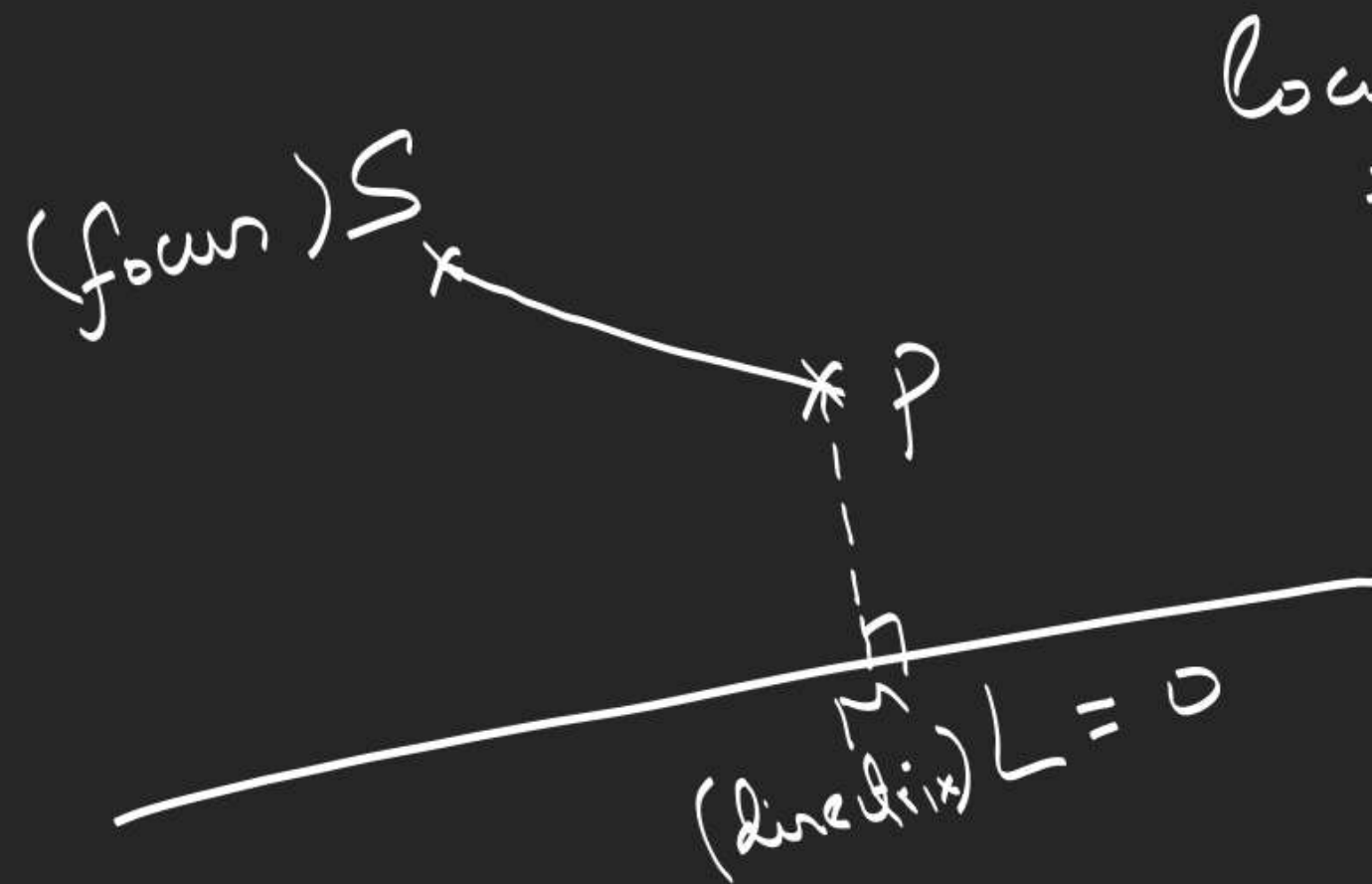
locus of P.

$$\frac{PS}{PM} = \text{const} = e \,(\text{eccentricity})$$

If focus lies on directrix, then
locus of P is pair of lines
passing thru
focus.

$L = 0$

$$\frac{PS}{PM} = e \ (const).$$

S

P

M

$e > 1$
2 distinct
real lines

$e = 1$
2 coincident
real lines

$0 < e < 1$
imaginary
lines.