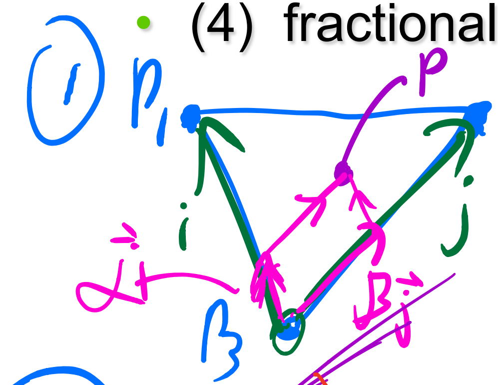
$$P = \alpha P_1 + \beta P_2 + \gamma P_3$$

Interpreting Barycentric Coordinates

- (1) coordinate system using edges as basis vectors
- (2) fractional distances
- (3) fractional areas
- (4) fractional weights



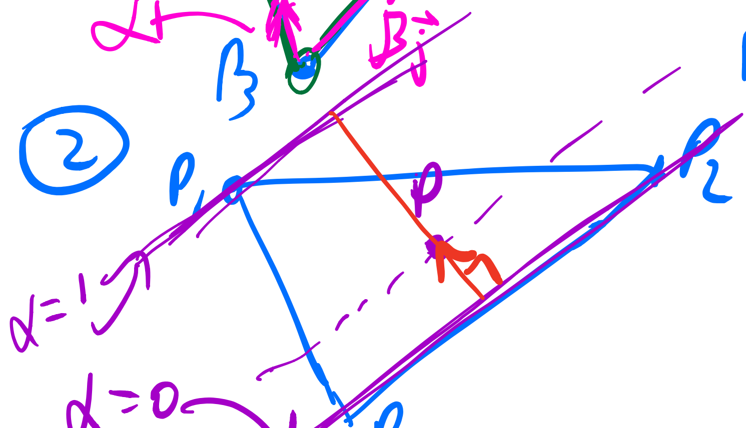
$$P = P_3 + \alpha \vec{i} + \beta \vec{j}$$

where $\vec{i} = P_1 - P_3$

$\vec{j} = P_2 - P_3$

$$P = P_3 + \alpha(P_1 - P_3) + \beta(P_2 - P_3)$$

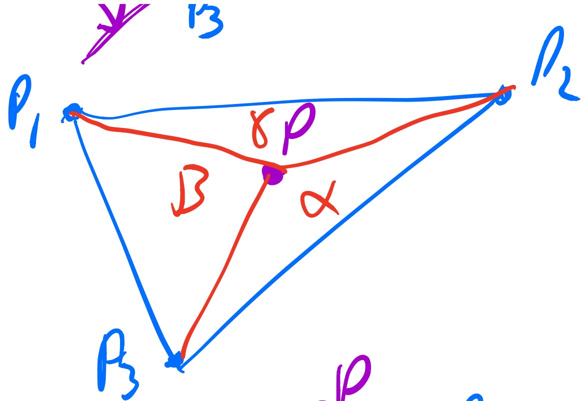
$$P = \alpha P_1 + \beta P_2 + \underbrace{(1-\alpha-\beta)}_{\gamma} P_3$$



α is the fractional away from the line $P_2 P_3$ toward P_1

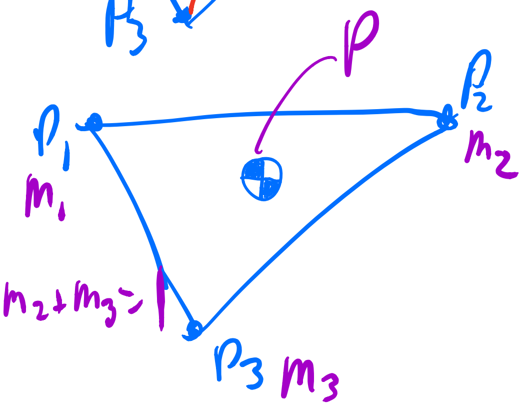
$\alpha = 0.3$

(3)



$$\alpha = \frac{\text{area } \Delta P P_2 P_3}{\text{area } \Delta P_1 P_2 P_3}$$

(4)



$m_1 + m_2 + m_3 = 1$

Imagine splitting 1kg of clay into lumps m_1, m_2, m_3 placed at the vertices.

Then center-of-mass is at point P

$$(m_1, m_2, m_3) \equiv (\alpha, \beta, \gamma)$$