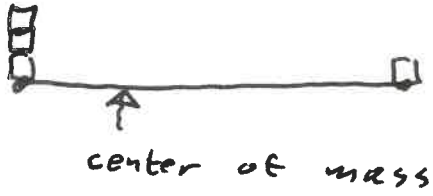
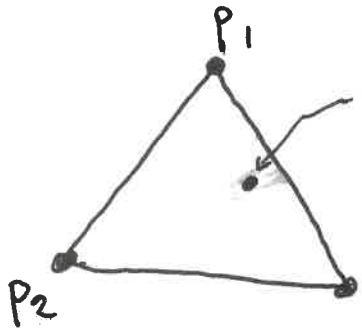
WHAT IS THE MAIN MESSAGE OF pp. 2-10?

Probability distributions form a convex set

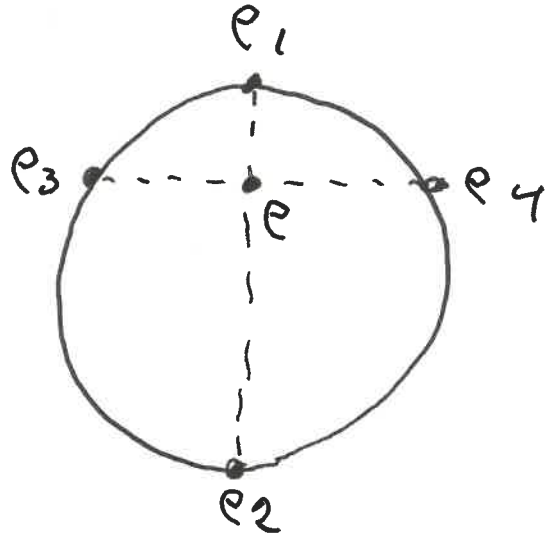


$m_1 + m_2 = 1\ kg$



Center of mass determines (p_1, p_2, p_3) uniquely

Same for density matrices, but with a difference



$$\rho = \begin{pmatrix} 3/4 & 0 \\ 0 & 1/4 \end{pmatrix} = \frac{3}{4}\begin{pmatrix} 1 & 0 \\ 0 & 0 \end{pmatrix} + \frac{1}{4}\begin{pmatrix} 0 & 0 \\ 0 & 1 \end{pmatrix} =$$

$$= \frac{1}{2}\begin{pmatrix} 3/4 & x \\ x & 1/4 \end{pmatrix} + \frac{1}{2}\begin{pmatrix} 3/4 & -x \\ -x & 1/4 \end{pmatrix}$$

$$\text{Det} = 0 \quad \Rightarrow \quad \frac{3}{4}\cdot\frac{1}{4} - x^2 = 0$$