$$g(\vec{x}) = \frac{x_1}{x_1 + x_2}$$

$$g(n\vec{p}) = \frac{np_1}{np_1 + np_2} = \frac{p_1}{p_1 + p_2}$$

$$\nabla g(\vec{x}) = \left(\frac{x_2}{(x_1 + x_2)^2} \quad -\frac{x_1}{(x_1 + x_2)^2} \quad 0 \right)$$

$$\nabla g(n\vec{p}) = \left(\frac{np_2}{(np_1 + np_2)^2} \quad -\frac{np_1}{(np_1 + np_2)^2} \quad 0 \right)$$

careful general

$$\sqrt{n}\left(\vec{X}_n - \vec{\theta}\right) \xrightarrow{\mathcal{D}} \mathcal{N}(0, M)$$

careful CLT

$$\sqrt{n}\left(\vec{\bar{X}}_n - \vec{\mu}\right) \to \mathcal{N}(0, M)$$

stop.