$\hat{y} = y + \eta$

$\boxed{n}$

$$U = \sum_{i=1}^{d} Y_i^2$$

$Y_i = \mu + \varepsilon$

$$\nabla U = 2 \sum Y_i \nabla Y_i$$

$\|a+b\| \le \|a\| + \|b\|$

$= \cancel{2\sum_i}$

$Y \nabla Y$

$-\|a+b\| \ge -\|a\| - \|b\|$

$\|$

Consider $i = 1$

$(\mu + \varepsilon)(\nabla\mu + \nabla\varepsilon)$

$\sup \varepsilon$

$= \| \mu\nabla\mu + \varepsilon\nabla\mu + \mu\nabla\varepsilon + \varepsilon\nabla\varepsilon \|$

$\ge \|\mu\nabla\mu\| - \|\varepsilon\nabla\mu + \mu\nabla\varepsilon + \varepsilon\nabla\varepsilon\|$

$\ge \|\mu\nabla\mu\| - \|\varepsilon\nabla\mu\| - \|\mu\nabla\varepsilon\| - \|\varepsilon\nabla\varepsilon\|$

$\mu = 0$ is a minimum so can assume $\underline{\mu \ne 0}$!