

$$\leq \frac{1}{\epsilon} \left(\frac{1}{n} \sum_{i=1}^n \left| \frac{\partial f_i}{\partial x_j}(x) - \frac{\partial f}{\partial x_j}(x) \right|^2 + \frac{1}{n} \sum_{i=1}^n \left| \frac{\partial f_i}{\partial x_k}(x) - \frac{\partial f}{\partial x_k}(x) \right|^2 \right)$$

$$\leq \frac{1}{\sqrt{\pi}} \left(\frac{1}{\sqrt{\pi}} + \frac{1}{\sqrt{\pi}} \right) = \frac{2}{\sqrt{\pi}}$$

[illegible]

$$\leq \frac{1}{\sqrt{\pi}} \left(\int_{-\infty}^{\infty} |f(x)|^2 dx \right)^{1/2} \left(\int_{-\infty}^{\infty} |g(y)|^2 dy \right)^{1/2}$$