

10.1

$$\text{MSE} = \frac{1}{N} \sum_i (I_{SR} - I_{HR})^2 = \frac{1}{N} L_2$$

$$\text{PSNR} = 10 \log_{10} \frac{I_{\max}^2}{\text{MSE}} \quad \text{e.g.} \quad 10 \log_{10} \frac{255^2}{\text{MSE}}$$

minimise L2, MSE equiv to max PSNR.

10.2

$$G^*, D^* = \arg \min_G \max_D L_{\text{CGAN}}(G, D) + \lambda L_H(G).$$

$$L_H(G) = |I - G(x, z)|$$

↑ input ↖ noise

$$L_{\text{CGAN}}(G, D) = \log D(y, x) + \log(1 - D(G(x, z), x))$$

conditional GAN.

In practice $\log(1 - D(G(\cdot)))$ is typically replaced

e.g. $-\log D(G(\cdot))$, also LSGAN.