MAP Optimization with NFs

$$\operatorname*{argmin}_{\mathbf{x}} \ \frac{1}{2}\|A\mathbf{x} - \mathbf{d}\|_2^2 + \log R(\mathbf{x})$$

Reparametrize optimization with trained generative network $\quad \mathbf{x} = G_\theta(\mathbf{z})$

Data misfit becomes $\quad \|A\mathbf{x} - \mathbf{d}\|_2 = \|AG_\theta(\mathbf{z}) - \mathbf{d}\|_2$

Since latent $\mathbf{z}$ is gaussian the regularization is directly given $\quad \log R(\mathbf{z}) = \|\mathbf{z}\|_2$

35 Asim, Muhammad, et al. "Invertible generative models for inverse problems: mitigating representation error and dataset bias." International Conference on Machine Learning. PMLR, 2020.

MAP Optimization with NFs

$$\underset{\mathbf{x}}{\text{argmin}} \quad \frac{1}{2}\|A\mathbf{x} - \mathbf{d}\|_2^2 + \log R(\mathbf{x})$$

Reparametrize optimization with trained generative network $\quad \mathbf{x} = G_\theta(\mathbf{z})$

Data misfit becomes $\quad \|A\mathbf{x} - \mathbf{d}\|_2 = \|AG_\theta(\mathbf{z}) - \mathbf{d}\|_2$

Since latent $\mathbf{z}$ is gaussian the regularization is directly given $\quad \log R(\mathbf{z}) = \|\mathbf{z}\|_2$

MAP Optimization becomes: $\quad \underset{\mathbf{z}}{\text{argmin}} \quad \frac{1}{2}\|AG_\theta(\mathbf{z}) - \mathbf{d}\|_2^2 + \frac{1}{2}\|\mathbf{z}\|_2^2$

 Asim, Muhammad, et al. "Invertible generative models for inverse problems: mitigating representation error and dataset bias." International Conference on Machine Learning. PMLR, 2020.