Normalizing Flows (Part 8)

Dr. Alireza Aghamohammadi

Residual Flows: iRevNet

Residual flows are inspired by residual networks. They divide the input into two parts: $h = \begin{bmatrix} h_1 \\ h_2 \end{bmatrix}$. The output is defined as follows:

$$h_1' = h_1 + f_1\left[h_2, \phi_1\right]$$
$$h_2' = h_2 + f_2\left[h_1', \phi_2\right]$$

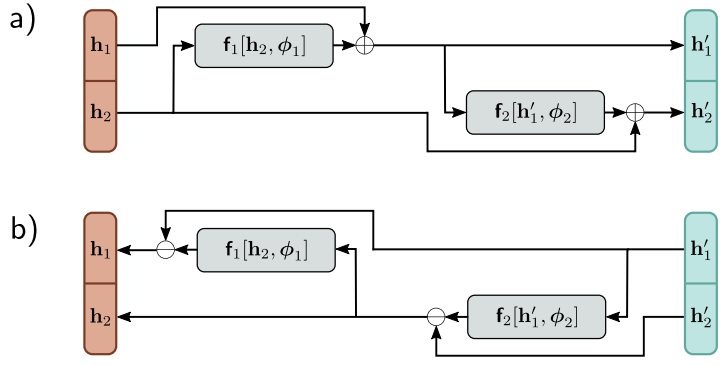

Image credit: Understanding Deep Learning

Considerations for Residual Flows

- The functions $f_1[\bullet, \phi_1]$ and $f_2[\bullet, \phi_2]$ do not need to be invertible.
- The inverse can be computed by reversing the order of computations:

$$h_2 = h_2' - f_2\left[h_1', \phi_2\right]$$
$$h_1 = h_1' - f_1\left[h_2, \phi_1\right]$$

- Inputs are permuted between layers.
- Although this formulation is easily invertible, there is no efficient way to compute the Jacobian for general functions $f_1[\bullet, \phi_1]$ and $f_2[\bullet, \phi_2]$.