**Invertible NN**

1. Half-step full $v$ update:

$$\mathbf{v}'_k = \Gamma^{\pm}(\mathbf{v}_k; \zeta_{\mathbf{v}_k})$$

2. Full-step **half** $x$ update:

$$\mathbf{x}'_k = m^k \odot \mathbf{x}_k + \bar{m}^k \odot \Lambda^{\pm}[\bar{\mathbf{x}}_k; \zeta_{\bar{\mathbf{x}}_k}]$$

3. Full-step **half** $x$ update:

$$\mathbf{x}''_k = \bar{m}^k \odot \bar{\mathbf{x}}'_k + m^k \odot \Lambda^{\pm}[\mathbf{x}'_k; \zeta_{\mathbf{x}'_k}]$$

4. Half-step full $v$ update:

$$\mathbf{v}''_k = \Gamma^{\pm}(\mathbf{v}'_k; \zeta_{\mathbf{v}'_k})$$