$|\mathbf{v}_k'| = \overline{\Gamma^{\pm}[\mathbf{v}_k; \zeta_{\mathbf{v}_k}]}$ 2. Update **half** of $\mathbf x$ via $ar{m}_k \odot \mathbf x_k$:

Invertible NN

1. Update ${f v}$:

$$egin{aligned} \mathbf{x}_k' \ = \ m_k \odot \mathbf{x}_k + \overline{m}_k \odot egin{aligned} \mathbf{\Lambda}^{\pm} \left[\mathbf{ar{x}}_k ; \zeta_{\mathbf{ar{x}}_k}
ight] \end{aligned}$$

3. Update (other) **half** of ${f x}$ using $m^k \odot {f x}'_k$:

$$egin{align*} \mathbf{x}_k'' &= ar{m{m}}^k \odot ar{\mathbf{x}}_k' + m{m}^k \odot egin{bmatrix} m{\Lambda}^{\pm} \left[\mathbf{x}_k'; \zeta_{\mathbf{x}_k'}
ight] \end{pmatrix}$$

$$\mathbf{x}_k'' = \overline{m}^k \odot \overline{\mathbf{x}}_k' + m^k \odot \overline{\Lambda^{\pm} \left[\mathbf{x}_k'; \zeta_{\mathbf{x}_k'}
ight]}$$
4. Half-step full \mathbf{v} update:

 $|\mathbf{v}_k''| = \left[\mathbf{\Gamma}^{\pm}[\mathbf{v}_k'; \zeta_{\mathbf{v}_k'}] \right]$