$$egin{aligned} egin{aligned} oldsymbol{v}'_k = oldsymbol{\Gamma^+}[v_k;\,\zeta_v] &\equiv v_k\odot\exp\left(rac{arepsilon_v^k}{2}oldsymbol{s}_v^k(\zeta_{v_k})
ight) - rac{arepsilon_v^k}{2}igg[\partial_x S(x_k)\odot\exp\left(arepsilon_v^koldsymbol{q}_v^k(\zeta_{v_k})
ight) + oldsymbol{t}_v^k(\zeta_{v_k})igg] \ &= oldsymbol{w}^k\odot x_k + ar{m}^k\odotigg(\Lambda^+[ar{x}_k;\,\zeta_{ar{x}}] \equiv oldsymbol{x}_k\odot\exp\left(arepsilon_x^koldsymbol{s}_x^k(\zeta_{x_k})
ight) + arepsilon_x^kigg[v_k'\odot\exp\left(arepsilon_x^koldsymbol{q}_x^k(\zeta_{x_k})
ight) + oldsymbol{t}_x^k(\zeta_{x_k})igg] \end{aligned}$$

x scaling

force scaling

v scaling

translation

translation

v scaling