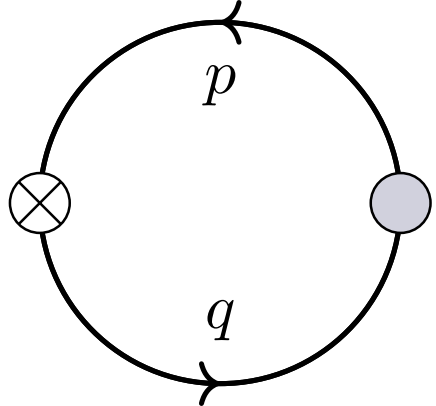
$$\partial_t \Gamma_k[\phi] = \frac{1}{2} \sum_{i,j=1}^{N} \int_{p,q} \partial_t R_{k,ij}\,(p,q)$$



$$\left[\Gamma_k^{(2)}[\phi] + R_k\right]^{-1}_{ji}\,(q,p)$$