$$u_{[0]} \ , \ \Delta u_{[k]}$$

$\downarrow$

$u_{[k]} = u_{[0]} + \Delta u_{[k]}$ $\xrightarrow{\textbf{forward}}$	$v_{[k]} = M\left(u_{[k]}\right)$ $\xrightarrow{\textbf{forward}}$	$\mathcal{J}_{[k]} = \mathcal{J}\left(M\left(u_{[k]}\right)\right)$

$\downarrow$

$$\nabla_u \mathcal{J}_{[k]}(\delta \mathcal{J}) = T^* \cdot \nabla_v \mathcal{J}|_{v_{[k]}}(\delta \mathcal{J}) \quad \xleftarrow{\textbf{adjoint}} \quad ad\,v_{[k]}(\delta \mathcal{J}) = \nabla_v \mathcal{J}|_{v_{[k]}}(\delta \mathcal{J}) \quad \xleftarrow{\textbf{adjoint}} \quad ad\,\mathcal{J} = \delta \mathcal{J}$$

$\downarrow \quad \mathcal{J}_{[k]}, \quad \nabla_u \mathcal{J}_{[k]}$

$$\mathcal{J}_{[k]} \ , \ \nabla_u \mathcal{J}_{[k]} \qquad \longrightarrow \qquad \textbf{minimisation} \qquad \longrightarrow \qquad \Delta u_{[k+1]}$$

$\downarrow$

$$\Delta u_{[k+1]}$$