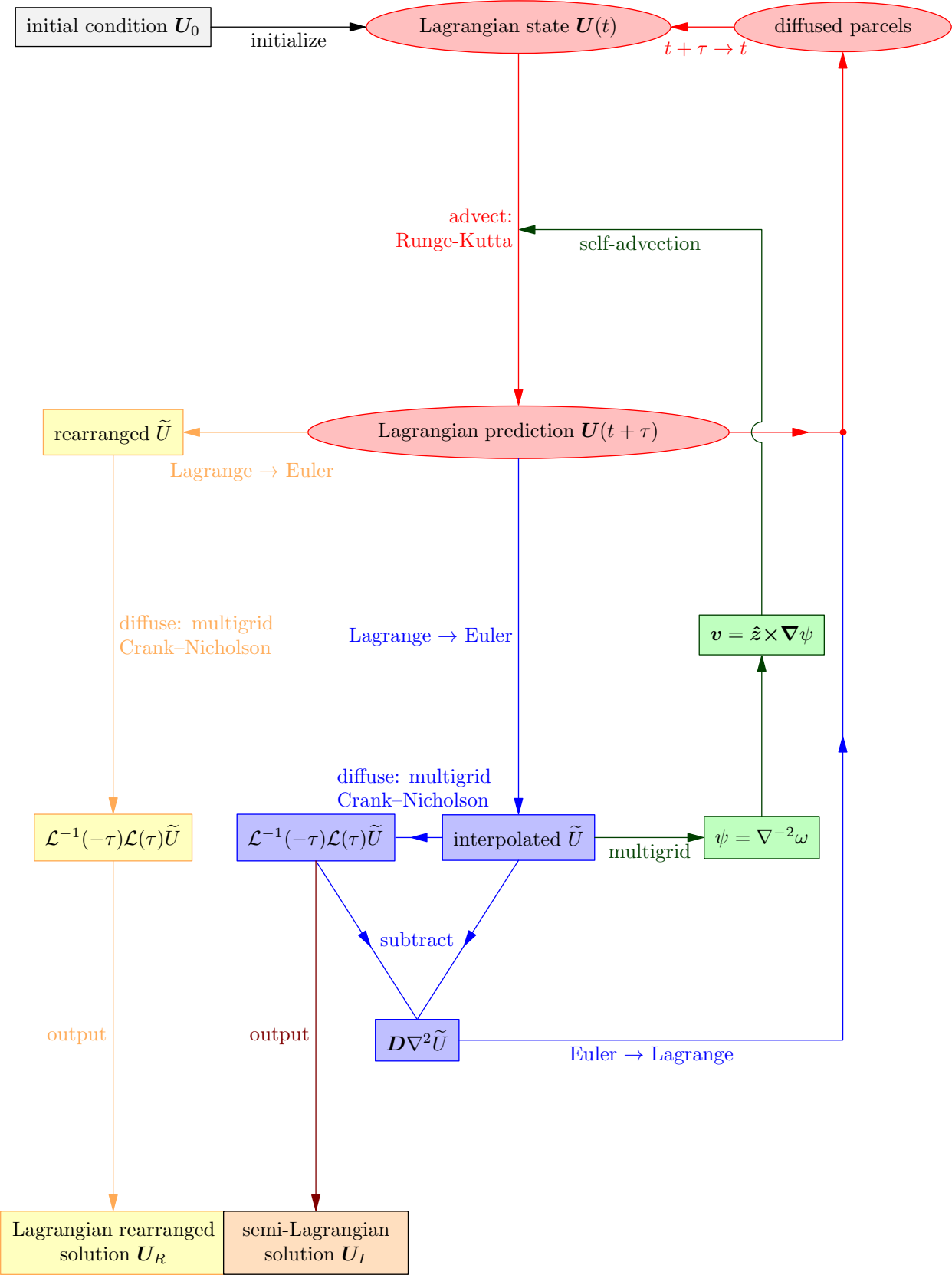
initial condition $\boldsymbol{U}_0$
initialize
Lagrangian state $\boldsymbol{U}(t)$
diffused parcels
$t+\tau \to t$
advect:
Runge-Kutta
self-advection
rearranged $\widetilde{U}$
Lagrangian prediction $\boldsymbol{U}(t+\tau)$
Lagrange $\to$ Euler
diffuse: multigrid
Crank–Nicholson
Lagrange $\to$ Euler
$\boldsymbol{v} = \hat{\boldsymbol{z}} \times \boldsymbol{\nabla}\psi$
diffuse: multigrid
Crank–Nicholson
$\mathcal{L}^{-1}(-\tau)\mathcal{L}(\tau)\widetilde{U}$
$\mathcal{L}^{-1}(-\tau)\mathcal{L}(\tau)\widetilde{U}$
interpolated $\widetilde{U}$
multigrid
$\psi = \nabla^{-2}\omega$
subtract
output
output
$\boldsymbol{D}\nabla^2\widetilde{U}$
Euler $\to$ Lagrange
Lagrangian rearranged solution $\boldsymbol{U}_R$
semi-Lagrangian solution $\boldsymbol{U}_I$