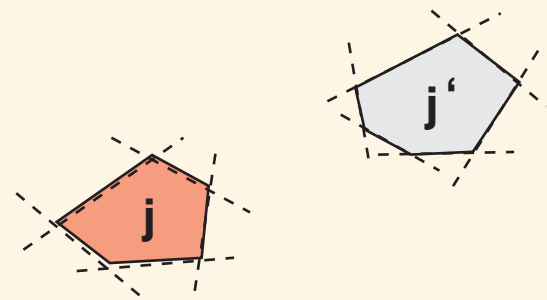
$$\frac{\partial h}{\partial t} = -H\,\delta$$

$$\frac{\partial}{\partial t}\delta = -g\,\nabla^2 h$$

$$\delta \equiv \nabla \cdot \mathbf{v}$$



$$\hat{h}_m^{n+1} = \hat{h}_m^n - H\Delta t\left(\sum_{j'} a_{j,j'}\,H_{j,j'}^m\right)\hat{\delta}_m^n \qquad (1)$$

$$\delta_j^{n+1} = \delta_j^n + g\Delta t\;\; m^2\left(\sum_{j'} a_{j,j'}\,H_{j,j'}^m\right)\hat{h}_m^{n+1} \qquad (2)$$

Amplification factor λ is given by $\lambda^2 - 2(1-2C)\lambda + 1 = 0$ with $C \equiv \frac{1}{4} gH(\Delta t)^2 m^2\left(\sum_{j'} a_{j,j'}\,H_{j,j'}^m\right)^2$

Requiring that this λ agree with λ for the trapezoidal scheme,

$$\sum_{j'} a_{j,j'}\,H_{j,j'}^m = \frac{1}{2}\frac{1}{\sqrt{1 + gH(\Delta t)^2 m^2/4}} \qquad (3)$$

Assume that we have already found $H_{j,j'}^m$. By solving the set of simultaneous equations obtained from (3) applied to different values of m, we can find $a_{j,j'}$.