Brief Article

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1 First section

In one-dimension:

$$C_{i-\frac{1}{2}}\left(h_{i-1}^{t}+h_{i}^{t}\right)+C_{i+\frac{1}{2}}\left(h_{i+1}^{t}+h_{i}^{t}\right)+\frac{S_{ijk}\Delta x\Delta y\Delta z}{\Delta t}\left(h_{i}^{t+1}-h_{i}^{t}\right)+w=0 \tag{1}$$

simplify equation 1 to:

$$\frac{\Delta t}{S_{ijk}\Delta x\Delta y\Delta z}\left[C_{i-\frac{1}{2}}\left(h_{i-1}^{t}+h_{i}^{t}\right)+C_{i+\frac{1}{2}}\left(h_{i+1}^{t}+h_{i}^{t}\right)+w\right]=h_{i}^{t}-h_{i}^{t+1} \tag{2}$$

rearrange equation 2 to:

$$h_{i}^{t+1}=h_{i}^{t}-\frac{\Delta t}{S_{ijk}\Delta x\Delta y\Delta z}\left[C_{i-\frac{1}{2}}\left(h_{i-1}^{t}+h_{i}^{t}\right)+C_{i+\frac{1}{2}}\left(h_{i+1}^{t}+h_{i}^{t}\right)+w\right] \tag{3}$$

equation 3 in matrix-vector form:

$$\mathbf{h}^{t+1}=\mathbf{h}^{t}-\frac{\Delta t}{\Delta x\Delta y\Delta z}\mathbf{S_{ijk}}\left[\mathbf{C}\mathbf{h}^{t}+\mathbf{w}\right] \tag{4}$$

Subject to the stability constraint:

$$max\left(\frac{C_{ijk}\Delta t}{S_{ijk}\Delta x\Delta y\Delta z}\right)\leq 1 \tag{5}$$

rearrange equation 5 to determine the maximum stable time step length:

$$\Delta t_{max}=\frac{S_{ijk}\Delta x\Delta y\Delta z}{C_{ijk}} \tag{6}$$

1.1 A subsection

More text.