



$$\Psi_N^{n+1} = 2(1 - \lambda^2)\Psi_N^n - \Psi_N^{n-1} + \frac{h\lambda^{2S_{N+1/2}}}{\bar{S}_N}\Psi_{N+1}^n + \frac{\lambda^2S_{N-1/2}}{\bar{S}_N}\Psi_{N-1}^n$$

$$\begin{aligned}\Psi_N^{n+1} &= 2(1 - \lambda^2)\Psi_N^n - \Psi_N^{n-1} \\ &\quad + \frac{\lambda^2S_{N+1/2}}{\bar{S}_N}\left[h\left(-\frac{a_1}{2k}(\Psi_N^{n+1} - \Psi_N^{n-1}) - \frac{a_2}{2}(\Psi_N^{n+1} + \Psi_N^{n-1})\right) + \Psi_N^n\right] \\ &\quad + \frac{\lambda^2S_{N-1/2}}{\bar{S}_N}\Psi_{N-1}^n\end{aligned}$$

$$\begin{aligned}\Psi_N^{n+1} &= 2(1 - \lambda^2)\Psi_N^n - \Psi_N^{n-1} + \frac{h\lambda^{2S_{N+1/2}}}{\bar{S}_N}\left[\left(-\frac{a_1}{2k} - \frac{a_2}{2}\right)\Psi_N^{n+1} + \left(\frac{a_1}{k} + \frac{a_2}{2}\right)\Psi_N^n\right] \\ &\quad + \frac{\lambda^2S_{N+1/2}}{\bar{S}_N}\Psi_N^n + \frac{\lambda^2S_{N-1/2}}{\bar{S}_N}\Psi_{N-1}^n\end{aligned}$$

$$\left(\frac{1}{k} + \frac{a_2}{2}\right)\frac{h\lambda^{2S_{N+1/2}}}{\bar{S}_N}\Psi_N^{n+1} = 2(1 - \lambda^2)\Psi_N^n - \Psi_N^{n-1} + \frac{h\lambda^{2S_{N+1/2}}}{\bar{S}_N}\left(\frac{a_1}{2k} - \frac{a_2}{2}\right)\Psi_N^{n-1}$$

$$+ \frac{\lambda^2S_{N+1/2}}{\bar{S}_N}\Psi_N^n + \frac{\lambda^2S_{N-1/2}}{\bar{S}_N}\Psi_{N-1}^n$$

$$\Psi_N^{n+1} = \frac{2(1 - \lambda^2)\Psi_N^n - \Psi_N^{n-1} + \frac{h\lambda^{2S_{N+1/2}}}{\bar{S}_N}\left(\frac{a_1}{2k} - \frac{a_2}{2}\right)\Psi_N^{n-1} + \frac{\lambda^2S_{N+1/2}}{\bar{S}_N}\Psi_N^n + \frac{\lambda^2S_{N-1/2}}{\bar{S}_N}\Psi_{N-1}^n}{\left(1 + \left(\frac{a_1}{2k} + \frac{a_2}{2}\right)\frac{h\lambda^{2S_{N+1/2}}}{\bar{S}_N}\right)}$$