The Kuramoto-Sivashinsky equation

$$u_t + u_{xx} + u_{xxxx} + uu_x = 0$$
$$u_t + u_{xx} + u_{xxxx} + \frac{1}{2}(u^2)_x = 0$$

Difference scheme:

$$u_t \approx \frac{\Delta u}{k} = \frac{U^{n+1} - U^n}{k}$$
$$u_{xx} \approx \frac{\delta^2 u}{h^2} = \frac{U_{m+1} - 2U_m + U_{m-1}}{h^2} = \frac{1}{h^2}A$$
$$u_{xxxx} \approx \frac{\delta^4 u}{h^4} = \frac{U_{m+2} - 4U_{m+1} + 6U_m - 4U_{m-1} + U_{m-2}}{h^4} = \frac{1}{h^4}AA$$
$$u_x^2 \approx \frac{\mu\delta u^2}{h} = \frac{(U_{m+1})^2 - (U_{m-1})^2}{2h} = \frac{1}{2h}D$$

$$U^{n+1} = U^n - \frac{k}{h^2}AU_m^n - \frac{k}{h^4}AAU_m^n - \frac{k}{4h}D(U_m^2 +$$