FS → unconditional stability

$$C^{n+1} = \frac{C^n}{(1+k\Delta t)}$$

$\frac{C^n}{(1+k\Delta t)} \geq 0$ (positive concentrations only)

and $1 + k\Delta t \neq 0$ (undefined)

$\therefore 1 + k\Delta t > 0$

$\therefore k\Delta t > -1$

$\therefore \Delta t > -\frac{1}{k}$ → Δt is always positive, so this scheme is stable for all values of Δt → $\therefore$ unconditionally stable