$$\boldsymbol{C_{3,i+1} = C_{3,i} + \frac{C_1 - C_3}{\tau} \frac{1-\beta}{(1-\alpha_1)\,\alpha_2\,(1-\alpha_3)}\,\Delta t}$$

$$C_1\,(1-\beta)\,\nu = C_3\,(1-\beta)\,\nu + (1-\alpha_1)\,\alpha_2\,(1-\alpha_3)\,V\,\frac{\mathrm{d}C_3}{\mathrm{d}t} \implies$$

$$\implies C_1\,(1-\beta) = C_3\,(1-\beta) + (1-\alpha_1)\,\alpha_2\,(1-\alpha_3)\,\tau\,\frac{\mathrm{d}C_3}{\mathrm{d}t} \implies$$

$$\implies \frac{\mathrm{d}C_3}{\mathrm{d}t} = \frac{C_1 - C_3}{\tau}\,\frac{1-\beta}{(1-\alpha_1)\,\alpha_2\,(1-\alpha_3)} \implies$$

$$\implies \frac{\Delta C_3}{\Delta t} = \frac{C_{3,i+1} - C_{3,i}}{\Delta t} = \frac{C_{1,i} - C_{3,i}}{\tau}\,\frac{1-\beta}{(1-\alpha_1)\,\alpha_2\,(1-\alpha_3)} \implies$$

$$\implies C_{3,i+1} = C_{3,i} + \frac{C_{1,i} - C_{3,i}}{\tau}\,\frac{1-\beta}{(1-\alpha_1)\,\alpha_2\,(1-\alpha_3)}\,\Delta t$$