$$\frac{\partial S_f}{\partial t} = \frac{D_S}{L_f^{۲}} \frac{\partial^{۲} S_f}{\partial x^{۲}} + \frac{x\left(L_f\right)_t^{'}}{L_f} \frac{\partial S_f}{\partial x} - q_{۱S} \frac{O_{۲f}}{K_{O_۲} + O_{۲f}} \frac{S_f}{K_S + S_f} X_{f□} - q_{۲} \frac{S_f}{K_{S,an} + S_f} X_{f□}$$