

$$\begin{aligned}
& \frac{\partial v}{\partial t} + \frac{\sigma^2 S^2}{2 \left(1 - \lambda(S, t) S \frac{\partial^2 v}{\partial S^2}\right)^2} \frac{\partial^2 v}{\partial S^2} + r S \frac{\partial v}{\partial S} - r v = 0, \quad (S, t) \in \Omega_0, \\
(1) \quad & \begin{aligned} & \Omega_0 = \\ & (0, +\infty) \times \\ & [0, T) \\ & S \\ & T \\ & \frac{\partial v}{\partial S} \\ & \frac{\partial^2 v}{\partial S^2} \\ & f(S) \\ & T = \\ & t \\ & u(S, \tau) = \\ & v(S, t) \\ & 0 < \\ & S < \\ & \bar{S} < \\ & b \\ & \bar{S} \\ & \bar{S} \\ & \bar{S} \\ & [0, b] \times \\ & [0, T] \\ & \frac{\partial u}{\partial \tau - \frac{\sigma^2 S^2}{2 \left(1 - \lambda(S, T - \tau) S \frac{\partial^2 u}{\partial S^2}\right)^2} \frac{\partial^2 u}{\partial S^2} - r S \frac{\partial u}{\partial S} + r u = 0, (S, \tau) \in \Omega, u(S, 0) = f(S)} \quad 0 < S < +\infty \end{aligned} \\
& \begin{aligned} & r > \\ & 0 > \\ & 0 > \\ & \lambda(S, \tau) \\ & \lambda(S, T - \\ & \tau) = \\ & \{ \gamma S (1 - e^{-\beta \tau}), \quad \underline{S} \leq \\ & \underline{S} \leq \\ & \bar{S} \\ & 0, \\ & \gamma > \end{aligned} \\
& \begin{aligned} & 0 \\ & 0 \\ & 0 \\ & 0 \\ & 0 \\ & 0 \\ & \frac{\partial u}{\partial \tau - r S \frac{\partial u}{\partial S} = -r u, \quad (S, \tau) \in (0, +\infty) \times (0, T], u(S, 0) = f(S)} \quad 0 < S < +\infty \\ & \tau) = \\ & f(S e^{r \tau}) e^{-r \tau}. \\ & \tau + \\ & \Delta \tau \in \\ & [0, T] \\ & u(S, \tau + \Delta \tau) = u(\hat{S}, \tau) (e^{-r \Delta \tau} - 1) + u(\hat{S}, \tau) \\ & \hat{S} e^{\frac{r}{\tau} \Delta \tau} \\ & \tau + \\ & \Delta \tau) - \\ & u(\hat{S}, \tau) \varphi(\Delta \tau) = \\ & -r u(\hat{S}, \tau) \\ & \varphi(\Delta \tau) = \\ & \frac{1 - e^{-r \Delta \tau}}{r} \\ & \frac{\partial u}{\partial \tau} = \\ & \frac{\partial u}{\partial \tau} - \\ & r S \frac{\partial u}{\partial S} \\ & N \\ & L \\ & h = \\ & \frac{b}{N} \\ & k_t = \\ & \frac{L}{L} = \\ & j h, h = \\ & \Delta S, 0 \leq \\ & j \leq \\ & N, \\ & \tau_n = \end{aligned}
\end{aligned}$$