

The Kachanov-Rabotnov and Time-Hardening models are defined in Eqs. (1) and (2), respectively.

$$\varepsilon_{kr}(t) = A\sigma^N \frac{[1 - (\phi + 1)M\sigma^\chi t]^{\frac{\phi+1-N}{\phi+1}} - 1}{M\sigma^\chi(N - \phi - 1)} \quad (1)$$

$$\varepsilon_{th}(t) = \frac{a\sigma^n t^{m+1}}{m + 1} \quad (2)$$

Suppose that there exists $t = t_i$ such that $\dot{\varepsilon}_{th}(t_i) = \dot{\varepsilon}_{kr}(t_i)$. Then the coupled creep model, $\varepsilon_{thkr}(t)$, can be defined by the expression shown in Eq. (3).

$$\varepsilon_{thkr}(t) = \begin{cases} \varepsilon_{th}(t), & \dot{\varepsilon}_{th}(t) < \dot{\varepsilon}_{kr}(t) \\ \varepsilon_{kr}(t - t_i) + \varepsilon_{th}(t_i), & \dot{\varepsilon}_{th}(t) \geq \dot{\varepsilon}_{kr}(t) \end{cases} \quad (3)$$