$$L_5 = \frac{ARa\mathrm{Gm}\left(s+RaR\right)\left(1-e^{-s}\right)}{s^2\left(s\,\mathrm{Pr}-s\mathrm{Sc}+B\right)\left(s\mathrm{Sc}-s-MRa\right)}$$

$$L_6 = \frac{ARa\mathrm{Gm}\left(s+RaR\right)\left(1-e^{-s}\right)}{s^2\left(s\,\mathrm{Pr}-s\mathrm{Sc}+B\right)\left(s\,\mathrm{Pr}-s-MRa+B\right)}$$

$A = \mathrm{ScSrPr}, B = RaR\,\mathrm{Pr}$

$$a_1 = -\frac{B}{\mathrm{Pr}-\mathrm{Sc}}, a_2 = \frac{Ra\mathrm{Gr}}{\mathrm{Pr}-1}, a_3 = \frac{MRa-B}{\mathrm{Pr}-1}$$

$$a_4 = \frac{Ra\mathrm{Gm}}{\mathrm{Sc}-1}, a_5 = \frac{RaM}{\mathrm{Sc}-1}, a_6 = \frac{A}{\mathrm{Pr}-\mathrm{Sc}}, a_7 = \frac{Ra\mathrm{Gm}}{\mathrm{Pr}-1}$$

$$A_1 = -\frac{a_1+RaR}{a_1^2}, A_2 = -\frac{RaR}{a_1}, A_3 = -A_1$$

$$A_4 = \frac{a_2}{a_3^2}, A_5 = -A_4, A_6 = -\frac{a_2}{a_3}, A_7 = -\frac{a_4}{a_5}$$

$$A_8 = \frac{a_4}{a_5}, A_9 = \frac{a_4a_6\left(a_1+RaR\right)}{a_1^2\left(a_1-a_5\right)}, A_{10} = \frac{a_4a_6\left(a_5+RaR\right)}{a_5^2\left(a_5-a_1\right)}$$

$$A_{11} = -\left(A_9+A_{10}\right), A_{12} = \frac{a_4a_6RaR}{a_1a_5}, A_{13} = \frac{a_6a_7\left(a_1+RaR\right)}{a_1^2\left(a_1-a_3\right)}$$

$$A_{14} = \frac{a_6a_7\left(a_3+RaR\right)}{a_3^2\left(a_3-a_1\right)}, A_{15} = -\left(A_{13}+A_{14}\right), A_{16} = \frac{a_6a_7RaR}{a_1a_3}$$

$\psi_1 = f(Pr\,R\,a, RaR, y, t), \bar{\psi}_1$
$= f(Pr\,R\,a, RaR, y, t-1)H(t-1)$

$\psi_2 = erfc\left(\frac{y\sqrt{RaSc}}{2\sqrt{t}}\right), \bar{\psi}_2 = erfc\left(\frac{y\sqrt{RaSc}}{2\sqrt{t-1}}\right)H(t-1)$

$\psi_3 = \lambda(\mathrm{Sc}Ra, y, t), \bar{\psi}_3 = \lambda(\mathrm{Sc}Ra, y, t-1)H(t-1)$

$\psi_4 = \psi(Ra\mathrm{Sc}, a_1, y, t), \bar{\psi}_4 = \psi(Ra\mathrm{Sc}, a_1, y, t-1)H(t-1)$

$\psi_5 = \psi(Pr\,R\,a, RaR, y, t), \bar{\psi}_5$
$= \psi(Pr\,R\,a, RaR, y, t-1)H(t-1)$

$\psi_6 = \psi(Pr\,R\,a, a_1+RaR, y, t), \bar{\psi}_6$
$= \psi(Pr\,R\,a, a_1+RaR, y, t-1)H(t-1)$

$\psi_7 = f(Ra, MRa, y, t), \bar{\psi}_7 = f(Ra, MRa, y, t-1)H(t-1)$

$\psi_8 = \psi(Ra, a_3+MRa, y, t), \bar{\psi}_8$
$= \psi(Ra, a_3+MRa, y, t-1)H(t-1)$

$\psi_9 = \psi(Ra, MRa, y, t), \bar{\psi}_9 = \psi(Ra, MRa, y, t-1)H(t-1)$

$\psi_{10} = \psi(Ra, a_5+MRa, y, t), \bar{\psi}_{10}$
$= \psi(Ra, a_5+MRa, y, t-1)H(t-1)$

$\psi_{11} = \psi(Ra, a_1+MRa, y, t), \bar{\psi}_{11}$
$= \psi(Ra, a_1+MRa, y, t-1)H(t-1)$

$\psi_{12} = \psi(Pr\,R\,a, a_3+RaR, y, t), \bar{\psi}_{12}$
$= \psi(Pr\,R\,a, a_3+RaR, y, t-1)H(t-1)$

$\psi_{13} = \psi(Ra\mathrm{Sc}, a_5, y, t), \bar{\psi}_{13}$
$= \psi(Ra\mathrm{Sc}, a_5, y, t-1)H(t-1)$

$\Omega_1 = F(Ra, RaM, t), \bar{\Omega}_1 = F(Ra, RaM, t-1)H(t-1)$

$\Omega_2 = \Omega(Ra, a_3+MRa, t), \bar{\Omega}_2$
$= \Omega(Ra, a_3+MRa, t-1)H(t-1)$

$\Omega_3 = \Omega(Ra, RaM, t), \bar{\Omega}_3 = \Omega(Ra, RaM, t-1)H(t-1)$

$\Omega_4 = \Omega(Ra, a_5+MRa, t), \bar{\Omega}_4$
$= \Omega(Ra, a_5+MRa, t-1)H(t-1)$

$\Omega_5 = \Omega(Ra, a_1+MRa, t), \bar{\Omega}_5$
$= \Omega(Ra, a_1+MRa, t-1)H(t-1)$

$\Omega_6 = \Omega(Pr\,R\,a, a_3+RaR, t), \bar{\Omega}_6$
$= \Omega(Pr\,R\,a, a_3+RaR, t-1)H(t-1)$

$\Omega_7 = \Omega(Pr\,R\,a, RaR, t), \bar{\Omega}_7$
$= \Omega(Pr\,R\,a, RaR, t-1)H(t-1)$

$\Omega_8 = F(Pr\,R\,a, RaR, t), \bar{\Omega}_8$
$= F(Pr\,R\,a, RaR, t-1)H(t-1)$

$\Omega_9 = -\sqrt{\frac{RaSc}{\pi t}}, \Omega_{10} = \Omega(Ra\mathrm{Sc}, a_5, t), \bar{\Omega}_{10}$
$= \Omega(Ra\mathrm{Sc}, a_5, t-1)H(t-1)$

$\Omega_{11} = \Omega(Ra\mathrm{Sc}, a_1, t), \bar{\Omega}_{11} = \Omega(Ra\mathrm{Sc}, a_1, t-1)H(t-1)$

$\Omega_{12} = L(Ra\mathrm{Sc}, t), \bar{\Omega}_{12} = L(Ra\mathrm{Sc}, t-1)H(t-1)$

$\Omega_{13} = \Omega(Pr\,R\,a, a_1+RaR, t), \bar{\Omega}_{13}$
$= \Omega(Pr\,R\,a, a_1+RaR, t-1)H(t-1)$

$$\psi(\xi,\eta,y,t) = \frac{1}{2}\left[\begin{matrix} e^{\sqrt{\xi\eta}y}erfc\left(\frac{y}{2}\sqrt{\frac{\xi}{t}}+\sqrt{\eta t}\right) \\ +e^{-\sqrt{\xi\eta}y}erfc\left(\frac{y}{2}\sqrt{\frac{\xi}{t}}-\sqrt{\eta t}\right)\end{matrix}\right]$$

$$f(\xi,\eta,y,t) = \left(\frac{t}{2}+\frac{y}{4}\sqrt{\frac{\xi}{\eta}}\right)e^{\sqrt{\xi\eta}y}erfc +$$
$$\left(\frac{t}{2}-\frac{y}{4}\sqrt{\frac{\xi}{\eta}}\right)e^{-\sqrt{\xi\eta}y}erfc\left(\frac{y}{2}\sqrt{\frac{\xi}{t}}-\sqrt{\eta t}\right)$$

$$\lambda(\xi,y,t) = \left(t+\frac{y^2\xi}{2}\right)erfc\left(\frac{y}{2}\sqrt{\frac{\xi}{t}}\right)-\frac{y\sqrt{\xi t}}{\sqrt{\pi}}e^{-\frac{\xi y^2}{4t}}$$

$$\Omega(\xi,\eta,t) = -\left[\sqrt{\frac{\xi}{\pi t}}e^{-\eta t}+\sqrt{\xi\eta}erf\left(\sqrt{\eta t}\right)\right]$$

$$F(\xi,\eta,t) = -\left[\begin{matrix}\frac{1}{2}\sqrt{\frac{\xi}{\eta}}erf\left(\sqrt{\eta t}\right)+ \\ t\sqrt{\xi\eta}erf\left(\sqrt{\eta t}\right)+\sqrt{\frac{\xi t}{\pi}}e^{-\eta t}\end{matrix}\right]$$

$$L(\xi,t) = -2\sqrt{\frac{\xi t}{\pi}}$$

$H\left(t-1\right) = \begin{cases}0, & t<1\\ 1, & t>1\end{cases}$ is the unit step function