Table (3) and Table (4) show the results of both codes with the modifications to how the codes calculate $\dot{Y}(i)$ for the second-order Runge-Kutta calculation of $Y(i)$, and how the code calculates the value of Δt. Now the results for $X_{^4He}$ differ by less than 0.0001, regardless of the value of Y_{min}. And the other mass fractions are in closer agreement than before. These tables correspond to $\eta_{10} = 3.0$. But Figure (8) shows that the codes agree for all relevant values of η_{10} for $Y_{min} = 0.0$. We get the same results for a non-zero Y_{min}.

The codes had several differences in calculating various thermal quantities, these differences being my original concern about the accuracy of the codes. I already mentioned how the Texas code evolved $\rho_{e+\gamma}$ via second order Runge-Kutta while the Thomas et al code evolved T. The Texas code also evolved the log of the expansion coefficient R, enabling it to use conservations rules like

$$\begin{aligned} RT_\nu &= \text{constant} \\ \rho_b R^3 &= \text{constant} \end{aligned}$$

to calculate neutrino temperature T_ν and baryon energy density ρ_b. The Thomas et al code never calculated R. Instead it evolved a factor h_v defined such that

$$\rho_b = h_v a \frac{15}{\pi^2} T^3$$

and it calculated T_ν from an equation derived from entropy conservation.

$$\begin{aligned} s &= \frac{R^3}{T}(\rho_{\gamma+e^\pm} + p_{\gamma+e^\pm}) \\ s &= \frac{4}{3} a (RT)^3 I\left(\frac{m_e}{kT}\right) \\ I(x) &= 1 + \frac{45}{2\pi^4}\int_0^\infty dy \frac{y}{e^{\sqrt{x^2+y^2}}+1}\left(\sqrt{x^2+y^2} + \frac{y^2}{3\sqrt{x^2+y^2}}\right) \\ \frac{T_o}{(T_\nu)_o} T_\nu &= \left[\frac{I(x)}{I(x_o)}\right]^{\frac{1}{3}} T \end{aligned}$$

The Thomas et al code also evolved the electron chemical potential ϕ_e. So it also took ϕ_e's temperature dependence into account when it needed to calculate $d\rho_{e+\gamma}/dT$ to get $\dot{T}$.