Useful information

The Friedmann equation is given by:

$$\left(\frac{\dot{a}}{a}\right)^2 = \frac{8\pi G\rho}{3} - \frac{kc^2}{a^2} + \frac{\Lambda c^2}{3},$$

where k and Λ are constants, $a = a(t)$ is the scale factor, and dots denote derivatives with respect to cosmic time, t.

The conservation equation for a type of matter/energy with density ρ and pressure p is

$$\dot{\rho} = -3\frac{\dot{a}}{a}\left(\rho + \frac{p}{c^2}\right).$$

The equation of state parameter, w, is defined by $p = w\rho c^2$.

The 3D Fourier transform convention used in cosmology is

$$f(\vec{x}) = \int \tilde{f}(\vec{k}) e^{i\vec{k}\cdot\vec{x}} \frac{d^3k}{(2\pi)^3}; \qquad \tilde{f}(\vec{k}) = \int f(\vec{x}) e^{-i\vec{k}\cdot\vec{x}} d^3x.$$

Unit conversions

$$\begin{aligned}
c &= 299792.6\,\mathrm{km/s} \\
G &= 6.674 \times 10^{-11}\,\mathrm{m^3\,kg^{-1}\,s^{-2}} \\
k_\mathrm{B} &= 1.381 \times 10^{-23}\mathrm{m^2\,kg\,s^{-2}\,K^{-1}} \\
1\,\mathrm{eV} &= 1.602 \times 10^{-19}\,\mathrm{J} \\
&= 1.602 \times 10^{-19}\,\mathrm{kg\,m^2\,s^{-2}}
\end{aligned}$$

$$\begin{aligned}
1\,M_\odot &= 1.988 \times 10^{30}\,\mathrm{kg} \\
1\,L_\odot &= 3.828 \times 10^{26}\,\mathrm{W} \\
1\,\mathrm{pc} &= 3.0857 \times 10^{16}\,\mathrm{m} \\
1\,\mathrm{deg} &= 3600\,\mathrm{arcsec} \\
1\,\mathrm{km/s/Mpc} &= 3.241 \times 10^{-20}\,\mathrm{s^{-1}} \\
&= 1.022 \times 10^{-12}\,\mathrm{yr^{-1}}
\end{aligned}$$