$$k = \frac{R^2}{c^2}\left(\frac{1.0001\times10^{-9}J/m^3}{1.6077\times10^{26}kg\,m^{-1}} - (2\times10^{-18}s^{-1})^2\right)$$

$$= \frac{2.2207 R^2 \times10^{-36} s^{-2}}{c^2} > 0 \text{ since } \frac{R^2}{c^2} > 0.$$ see opposite for $R(t_0)$

k expresses qualitatively the curvature of spacetime:

If k=1, space and spacetime are positively curved, like the surface of a sphere (universe is closed)

If k=0, the spatial part of spacetime is flat like a plane ie Euclidean Universe is critical, but spacetime is not flat unless $\frac{dR}{dt} = 0$, which is never the case in a critical universe

If k=-1 space and spacetime are negatively curved, like surface of a horn. Universe is open.

A quantitative measure of the curvature of space is given by $\frac{k}{R^2}$, a measure of the Riemannian curvature of space

If k=1, $R \to R_{max}$ ∴ curvature of space $\to \frac{1}{R_{max}^2}$

If k=-1 $R \to \infty$ ∴ curvature of space $\to \frac{-1}{\infty^2} = 0$

If k=0 curvature of space = 0

In all case curvature of space = 0 or tends to 0 as R increases, though for a closed universe this is true only while R is increasing ie $\frac{dR}{dt} > 0$