

442 Tutorial Sheet 7¹

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1. (3) Find the Robinson-Walker solution with positive cosmological constant and no matter for all three values of k .
2. (2) The *particle horizon* is the radius of the sphere of all particles that could be seen by us. It is the maximum straight line distance that could have been travelled by a light ray since the beginning of the universe. Obviously, in a static universe this would be t_0 . What is it for a $k = 0$ dust universe?
3. (2) What is the particle horizon for an inflating universe.
4. (1) Find an integral formula for the age of the universe with general k and $\Lambda \neq 0$. This integral is elliptic and can be integrated explicitly in terms of elliptic functions. This is not required here.
5. (3) Calculate the leading order correction to the age of a dust universe with $\Omega_0 = 1 + \epsilon$ and $\epsilon > 0$. We previously looked at $\Omega_0 = 1 - \epsilon$.

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