

Cosmology 1

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Proposed problem, lecture 11

Topic: models without cosmological constant.

Plot with your favourite plotting program, as a function of cosmic time t (in Gyr), the evolution of the scale factor $a(t)$ and of the hubble parameter $H(t)$ (in $\text{km s}^{-1} \text{Mpc}^{-1}$) for the following models:

- EdS05: $h = 0.5$, $\Omega_m = 1$;
- EdS07: $h = 0.7$, $\Omega_m = 1$;
- Rad: flat model with radiation, $h = 0.5$, $\Omega_r = 1$;
- Open: $h = 0.7$, $\Omega_m = 0.3$, $\Omega_k = 0.7$;
- Closed: $h = 0.7$, $\Omega_m = 1.5$, $\Omega_k = -0.5$;

You can continue this exercise with the luminosity and diameter distances $d_L(t)$ and $d_D(t)$ (in Mpc), the comoving horizon distance d_H , the density $\rho(t)$ (in kg m^{-3}) and, for non-flat models, the density parameter $\Omega(t)$ and the deceleration parameter $q(t)$.