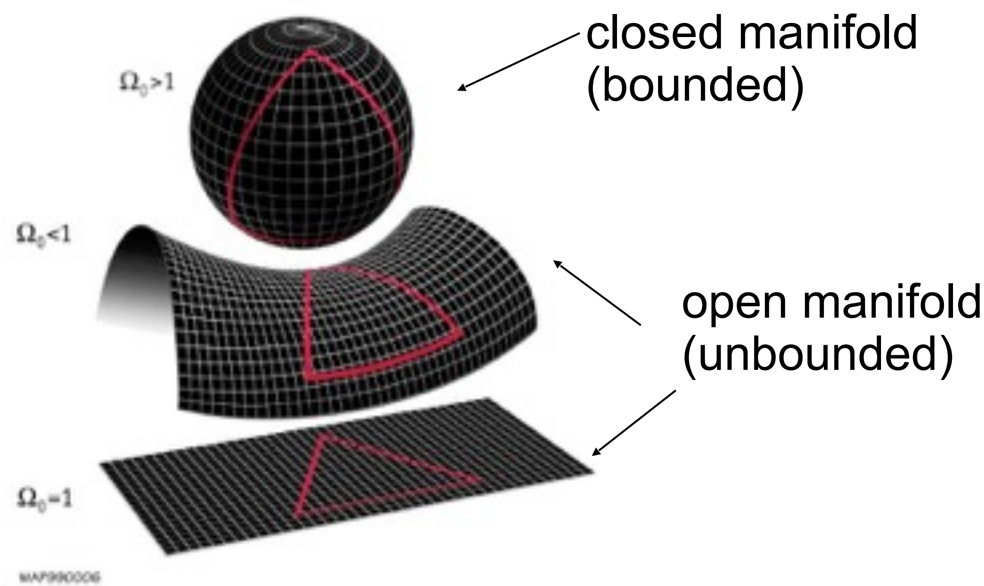
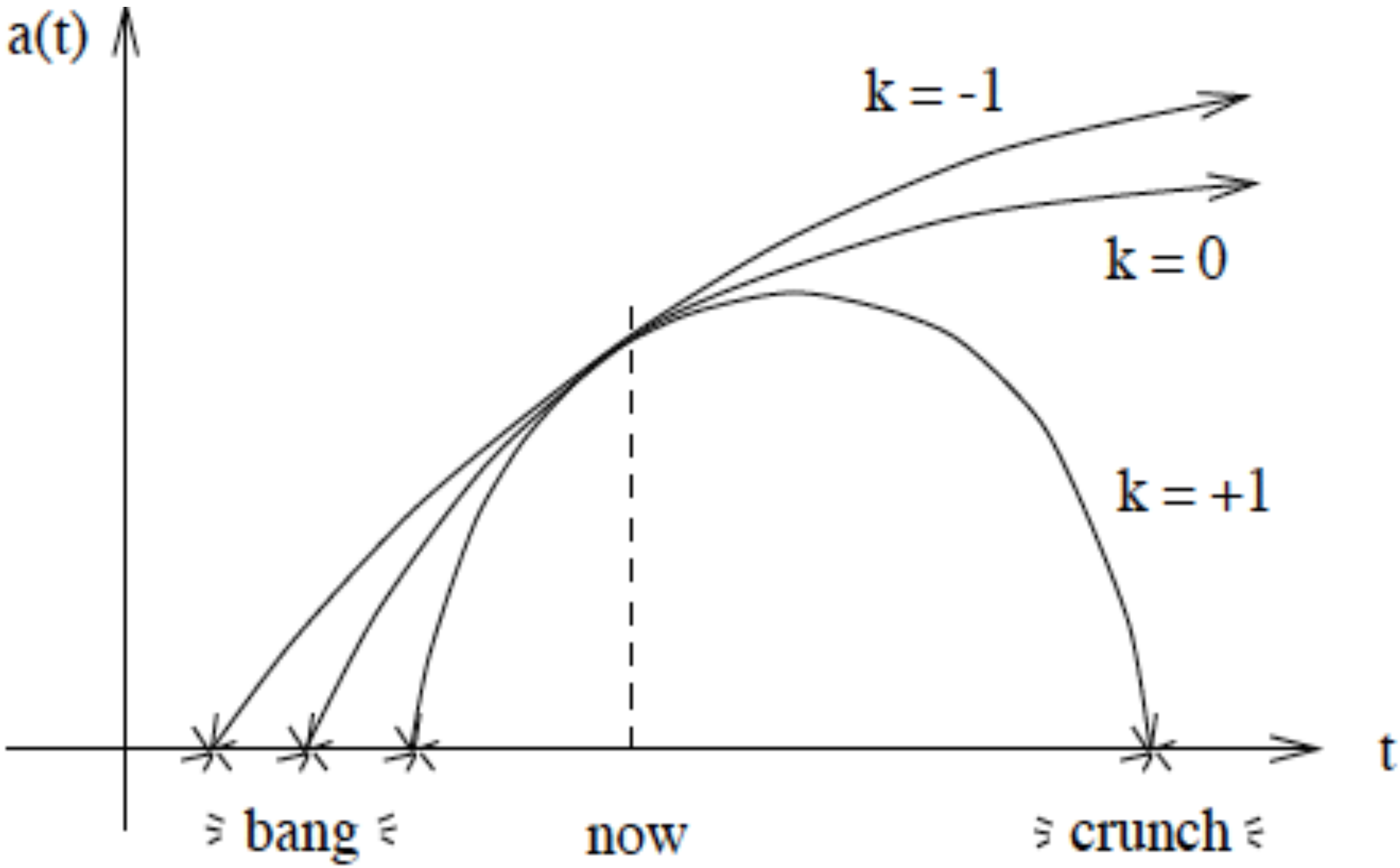
Spatial part of FRW metric describes an homogeneous and isotropic 3D hypersurface in a 4D-spacetime (spherically symmetric 3-space like in Schwarzschild metric)

$$\mathrm{d}\boldsymbol{\Sigma}^2 = \frac{\mathrm{d}r^2}{1-kr^2} + r^2\mathrm{d}\boldsymbol{\Omega}^2, \quad \text{where } \mathrm{d}\boldsymbol{\Omega}^2 = \mathrm{d}\theta^2 + \sin^2\theta\,\mathrm{d}\phi^2.$$

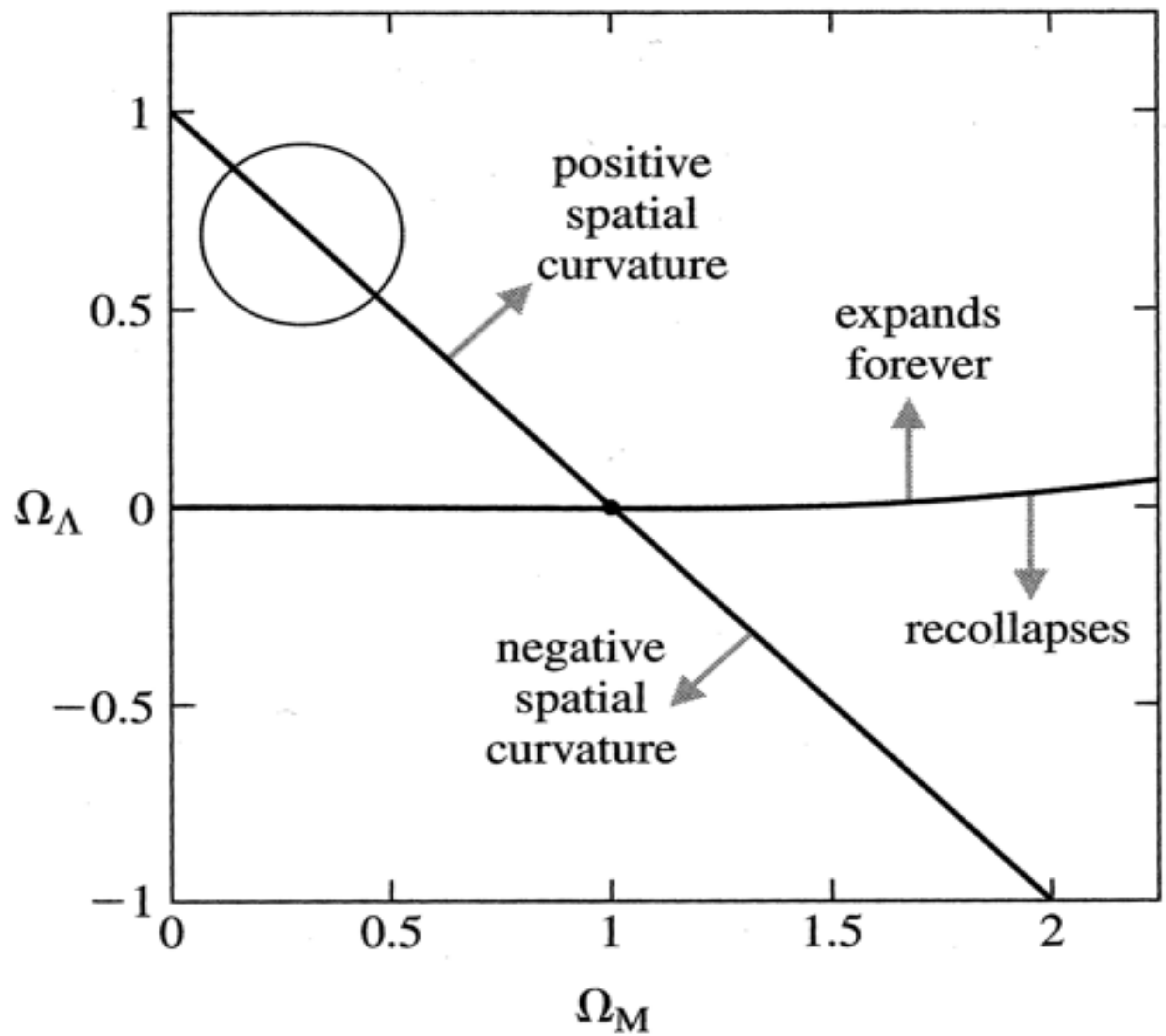
Coefficients depend only on spherical coordinate *r*, as expected from isotropy.
With **curvature signature *k***=-1, 0 or + 1 being related to **scalar curvature R** of the surface (***k*= R/6** in 3-space)
k=0 is the euclidian space case = flat 3-surface (in 3- space it would be a plane).
k=+1 corresponds to 3-sphere;
and *k*=-1 to a 3-kyperbolic surface (saddle).

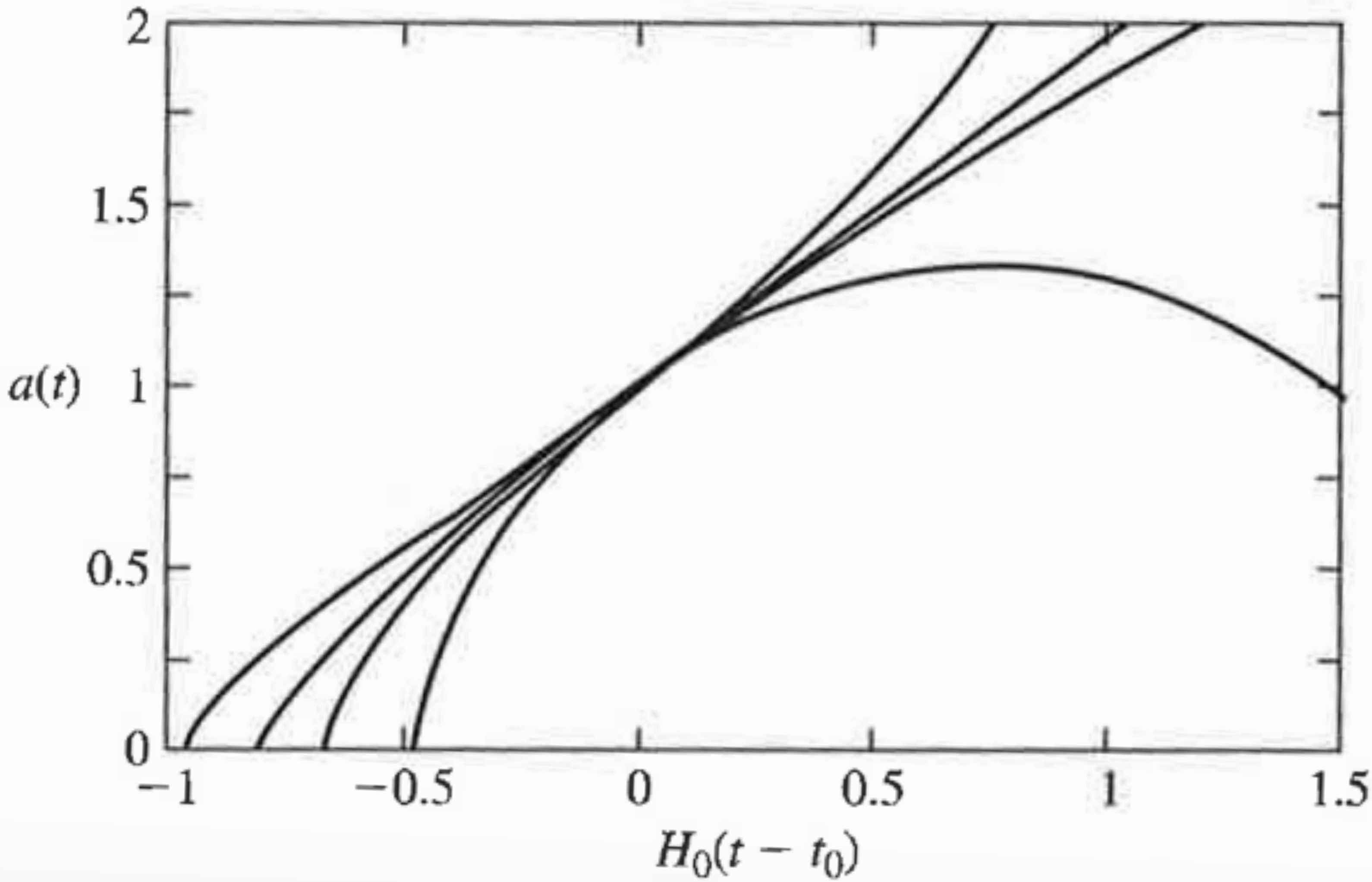


Solutions of Friedmann equations for various values of spatial curvature signature *k*



Behaviour of scale factor and geometry of world models with arbitrary values of Ω_M (always positive) and Ω_Λ (negative or positive).
Note there is no correspondence between open/flat/closed spatially and open/closed in time as in Universes with $\Omega_\Lambda=0$





Scale factor evolution for models with different Ω_M and Ω_Λ.
From top to bottom (Ω_M, Ω_Λ) = (0.3, 0.7), (0.3, 0), (1,0) , (2, 0)