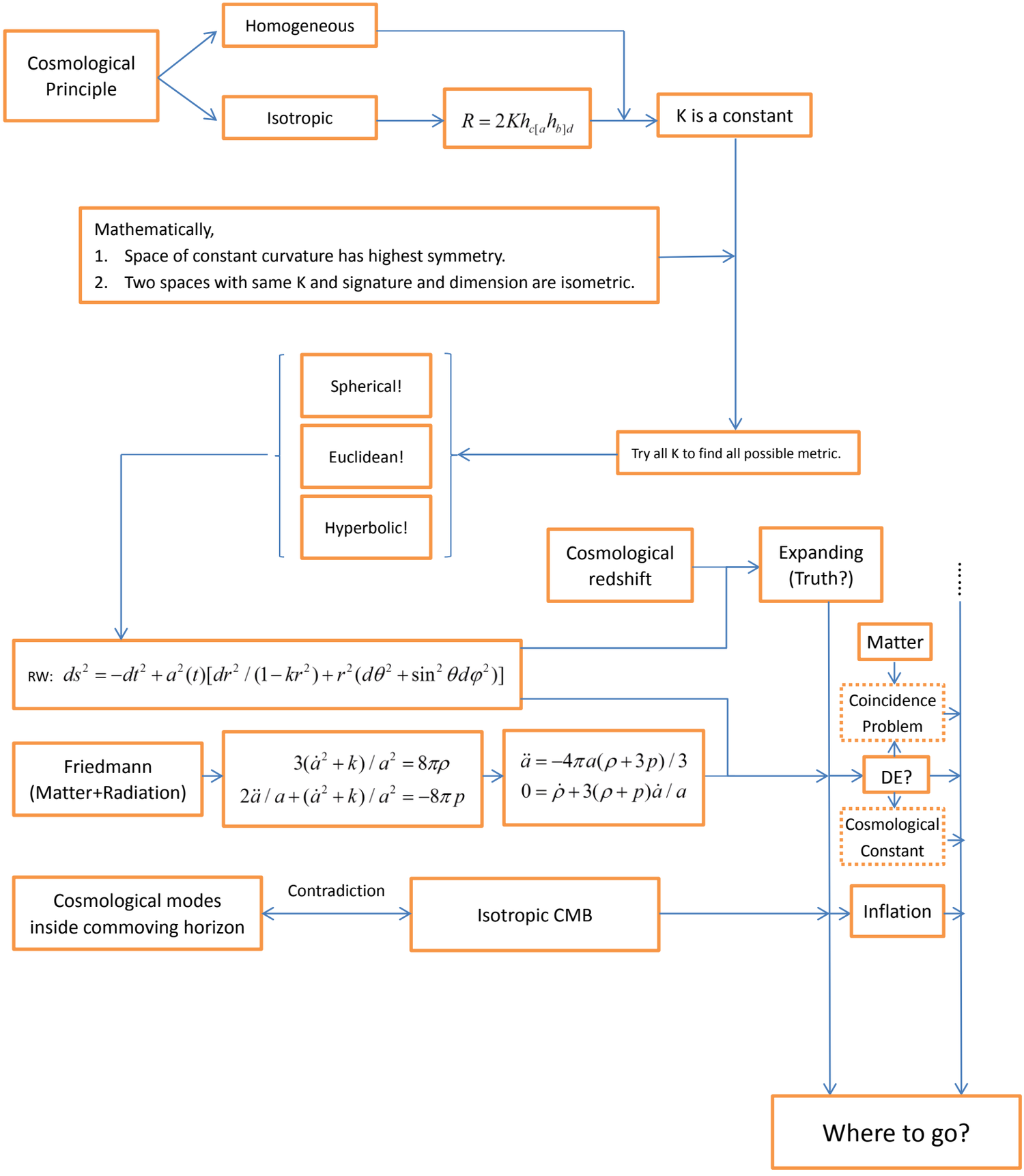
Cosmological Principle
Homogeneous
Isotropic
$R = 2Kh_{c[a}h_{b]d}$
K is a constant
Mathematically,
1. Space of constant curvature has highest symmetry.
2. Two spaces with same K and signature and dimension are isometric.
Spherical!
Euclidean!
Hyperbolic!
Try all K to find all possible metric.
Cosmological redshift
Expanding (Truth?)
Matter
RW: $ds^2 = -dt^2 + a^2(t)[dr^2/(1-kr^2) + r^2(d\theta^2 + \sin^2\theta d\varphi^2)]$
Coincidence Problem
Friedmann (Matter+Radiation)
$3(\dot{a}^2 + k)/a^2 = 8\pi\rho$
$2\ddot{a}/a + (\dot{a}^2 + k)/a^2 = -8\pi p$
$\ddot{a} = -4\pi a(\rho + 3p)/3$
$0 = \dot{\rho} + 3(\rho + p)\dot{a}/a$
DE?
Cosmological Constant
Cosmological modes inside commoving horizon
Contradiction
Isotropic CMB
Inflation
Where to go?