

Swihart Ch. 11 Main Concepts

Classical cosmology, ideal model universe, uniform density sphere

Scale factor R , radial coordinate r

Hubble's Law and scale factor R , H_0 (Hubble's constant) at time t_0 (now)

Expansion function/behavior (using energy considerations)

Age of universe estimate for "massless" universe

Signs of total energy (E) and integration constant (k)

Critical density of universe

Possible evolutionary tracks of universe (4 cases...)

Cosmic Microwave Background (CMB)

Blackbody spectrum, observed T of CMB

Ionized hydrogen, Compton scattering, optically "thick" hot medium

Matter/radiation decoupling (recombination), origin of CMB

Neutral hydrogen, optically "thin" cool medium

Temperature at time of recombination, radiation domination of early universe

Redshift and expansion factor, $1 + z$

Redshift of universe at recombination epoch, wall of plasma

Extra: Dark Energy

Composition and constituents of the universe (baryons, dark matter, dark energy)

Dark energy and the 4th evolutionary track for the universe

Fate of the universe