Redshift Derivation

The light and radiation from distant galaxies exhibits a ‘redshift’ in that its wavelength, λ, lengthens and its frequency, f, decreases in proportion to the distance that it has travelled to the observer.

Redshift $= Z = \frac{\lambda_o}{\lambda_e}$ -1

Where λ_o = observed wavelength, λ_e = expected wavelength, and the -1 simply starts the scale at zero rather than 1.

Now wavelength, λ, times frequency, f, still always equals lightspeed, c.

$$\lambda_e f_e = \lambda_o f_o = \mathrm{c}$$

However $\lambda_e f_o < \mathrm{c}$

$$\lambda_e f_o = \mathrm{c} - \sqrt{dA}$$

Where d = astronomical distance, A = Anderson acceleration. The Anderson acceleration (the small positive curvature of the hypersphere of the universe) works against the passage of light over the astronomical distance, d.

So substituting $f_o = \frac{c}{\lambda_o}$

We obtain $\frac{\lambda_e c}{\lambda_o} = \mathrm{c} - \sqrt{dA}$

And rearranging we obtain $\frac{\lambda_o}{\lambda_e} = \frac{c}{c - \sqrt{dA}}$

Therefore Redshift, Z = $\frac{\lambda_o}{\lambda_e} = \frac{c}{c - \sqrt{dA}}$ -1

Thus redshift gives a measure of distance not recession velocity or the ‘expansion’ of the entire universe. The Hubble constant has a value of precisely zero kilometres per second per magaparsec.