Redshift Derivation

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

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

Where $\lambda_o = \text{observed wavelength}$, $\lambda_e = \text{expected wavelength}$, and the -1 simply starts the scale at zero rather than 1.

Now wavelength, $\lambda$, times frequency, $f$, still always equals lightspeed, $c$.

$$\lambda_e f_e = \lambda_o f_o = c$$

However $\lambda_e f_o < c$

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

Where $d = \text{astronomical distance}$, $A = \text{Anderson acceleration}$. 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 $\frac{\lambda_e c}{\lambda_o} = c - \sqrt{dA}$

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.