Redshift — an explanation

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Redshift is an increase in the wavelength λ of electromagnetic radiation. This can be defined as a decrease in the frequency f of electromagnetic radiation, alternatively. The opposite phenomenon is blueshift: a decrease in λ and an increase in f.
There are 3 forms of redshift in astronomy and cosmology:

- Doppler redshift
- Gravitational redshift
- Cosmological redshift

The value of a colour shift; i.e., its offset from the original colour, is denoted by z, which is dimensionless. z is positive for redshifts, and negative for blueshifts.
To calculate redshift, the following formulae exist.
Using wavelength:

$$z = \frac{\lambda_{\text{observed}} - \lambda_{\text{emitted}}}{\lambda_{\text{emitted}}}$$

Using frequency:

$$z = \frac{f_{\text{emitted}} - f_{\text{observed}}}{f_{\text{observed}}}$$