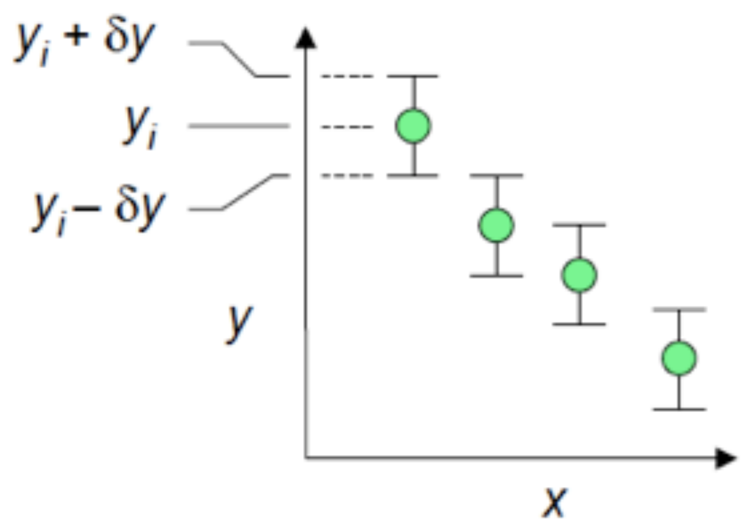
Logarithmic Error Bars

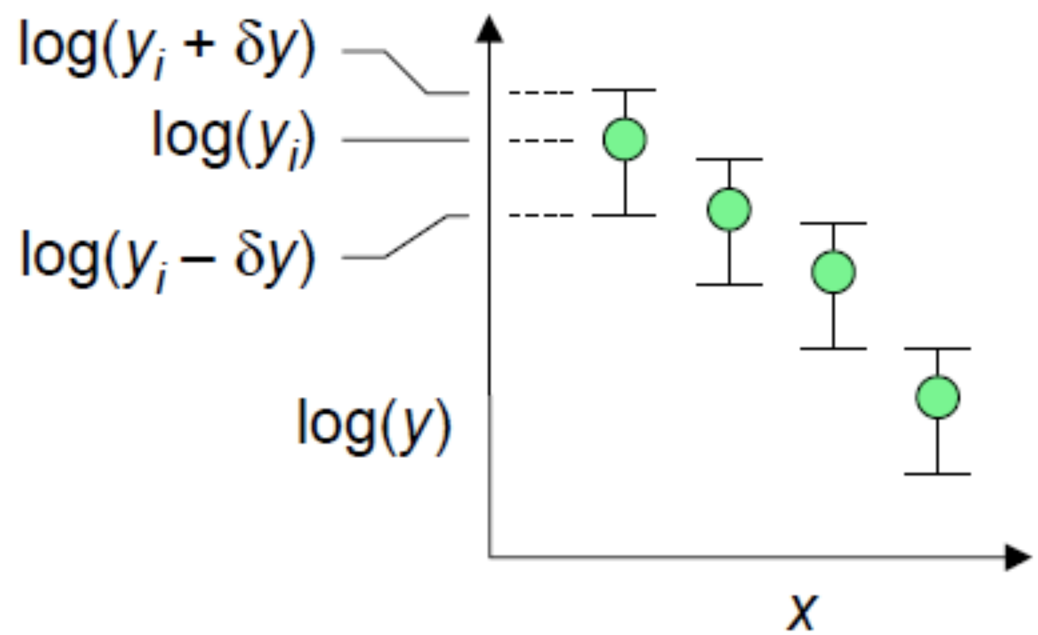
- Suppose that one has a sufficient number of measurements to make an estimate of a measured quantity *y* and report its error, $\pm\,\delta y$.

- The error, $\pm\,\delta y$, is represented on a Cartesian plot by extending lines of the appropriate size above and below the point *y*.



log Error Bars (cont.)

- If plotted on a logarithmic plot, however, this practice leads to asymmetric error bars.



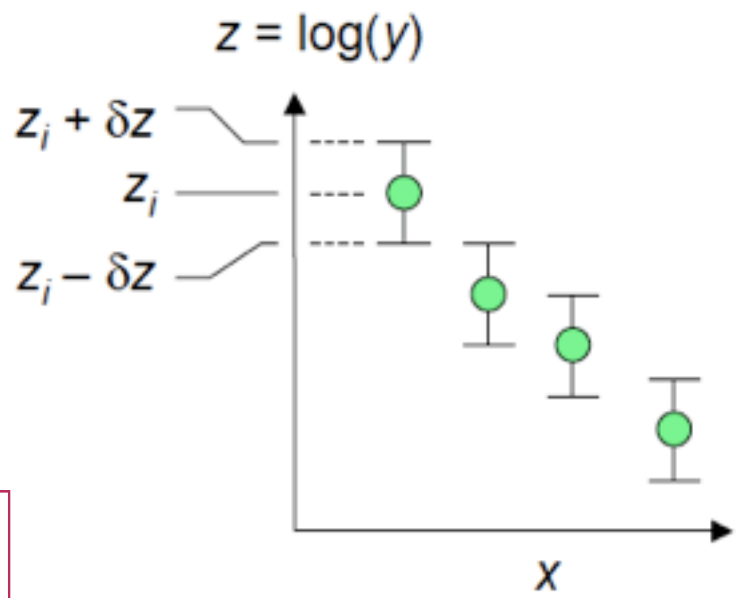
log Error Bars (cont.)

- On the assumption of small errors, a differiential analysis can be used

$$\delta z \approx dz = d\left[\log(y)\right] = \frac{1}{2.303}\frac{dy}{y} \approx 0.434\frac{\delta y}{y}$$

- The error δz is thus given by the *relative error* in y

$$\boxed{\delta z \approx 0.434\frac{\delta y}{y}}$$



$\boxed{\ln(10)}$