34   A (Long) Digression on the EV Formula for Math Lovers (*Optional*)

If you are resistant to mathematics, just skip this section 34 and go directly to the next section 35, with one click, with a light heart and no regret. A definitely more ambitious solution would be to first refresh your knowledge in mathematics by reading [8].

34.1   The EV Formula

But if you like formulas, here is one

$$EV \;=\; \log_2\left(\frac{100 \times f^2}{I \times s}\right) \text{ where } \quad \begin{aligned} EV &: \text{Exposure Value} \\ I &: \text{ISO} \\ f &: \text{lens aperture} \\ s &: \text{shutter speed} \\ & \quad \text{in seconds} \end{aligned} \qquad (1)$$

An EV is a number representing the ISO I, aperture f, and exposure time (or shutter speed) s to be set on a camera for the camera sensor (film or electronic) to capture a given quantity of light during s seconds. Lower EV numbers indicate low light (so more light is needed for the photo) while higher EVs indicate more light (so less light is needed for the photo). This means that an EV is also a measurement of the subject brightness based on camera settings (different from but related to luminance based on photometry in optics). In a dark, unlit room, the exposure time with ISO 100, during 1 s, with aperture of $f/1.0$ of the camera is $EV = \log_2 1 = 0$ (see figure 12). If the quantity of light captured by the camera sensor and the subject brightness coincide, the photo is well-exposed.