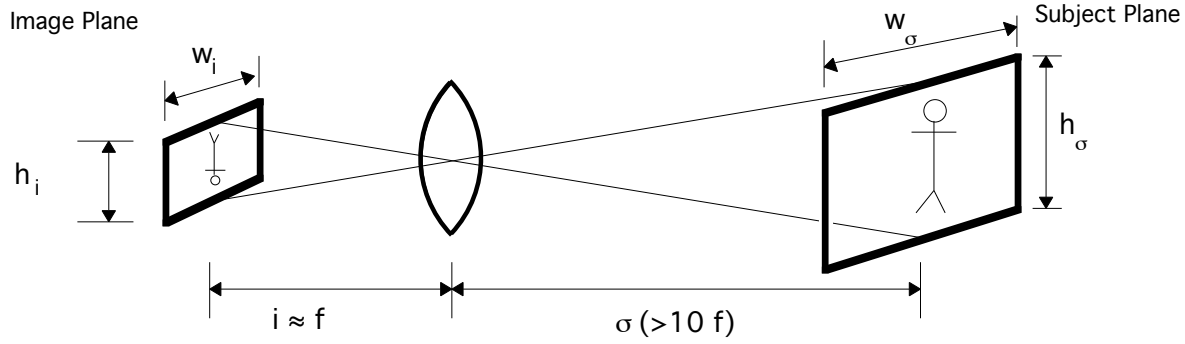
6.163: Lens selection guidelines

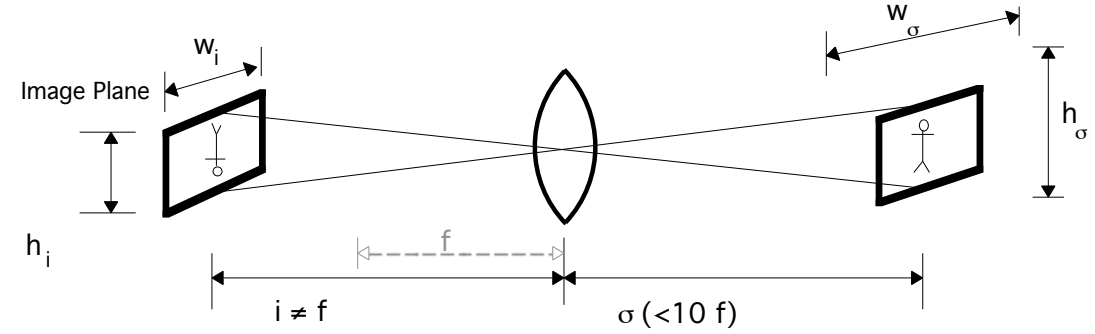
Case 1: Subject far from Camera (i.e., $\sigma > 10\,f$).



$$\text{magnification } m = \frac{h_i}{h_\sigma} = \frac{w_i}{w_\sigma} = i/\sigma \approx f/\sigma \text{ (if } \sigma > 10\,f)$$

Or, given h_i and w_i (24 mm for 35 mm film), $\sigma = f \times h_\sigma / h_i$.

Case 2: Subject close to Camera (i.e., $\sigma \leq 10\,f$)



$$\text{magnification } m = \frac{h_i}{h_\sigma} = \frac{w_i}{w_\sigma} = i/\sigma \quad \text{And, } \frac{1}{f} = \frac{1}{i} + \frac{1}{\sigma}$$

Can also find: $\frac{1}{i} = \frac{1}{f} - \frac{1}{\sigma} = \frac{\sigma - f}{\sigma f}$ And $m = \frac{f}{\sigma - f}$