FIGURE 28.26. The diffusion approximation is derived using a Taylor’s series (Box 28.6). The red curve shows the distribution of fluctuations, \( f(y) \), and the blue curve shows the probability distribution \( \psi(x) \). If the distribution of fluctuations is narrow, then the distribution can be approximated by a quadratic curve

\[
\psi(x) - y \frac{d\psi}{dx} + \frac{\gamma^2}{2} \frac{d^2\psi}{dx^2}.
\]

shown by the dotted line.