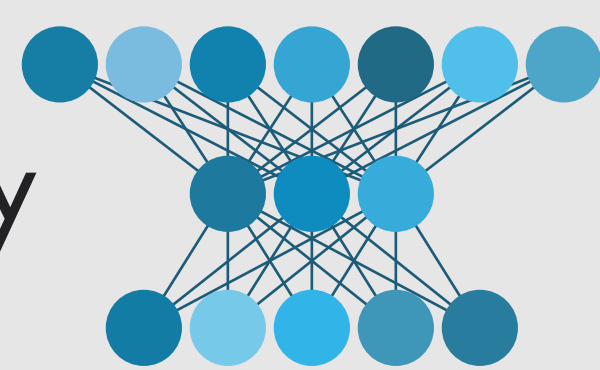
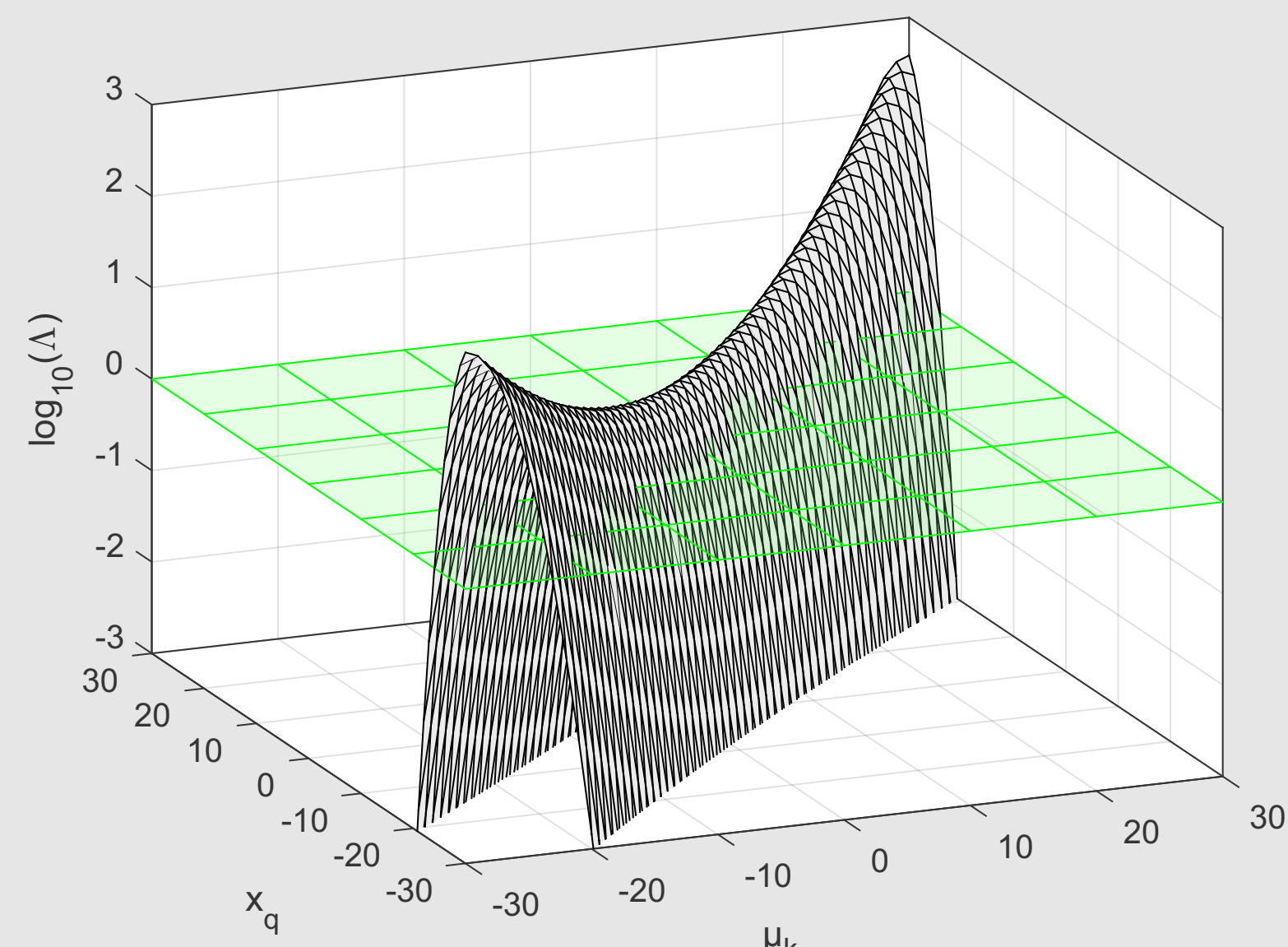
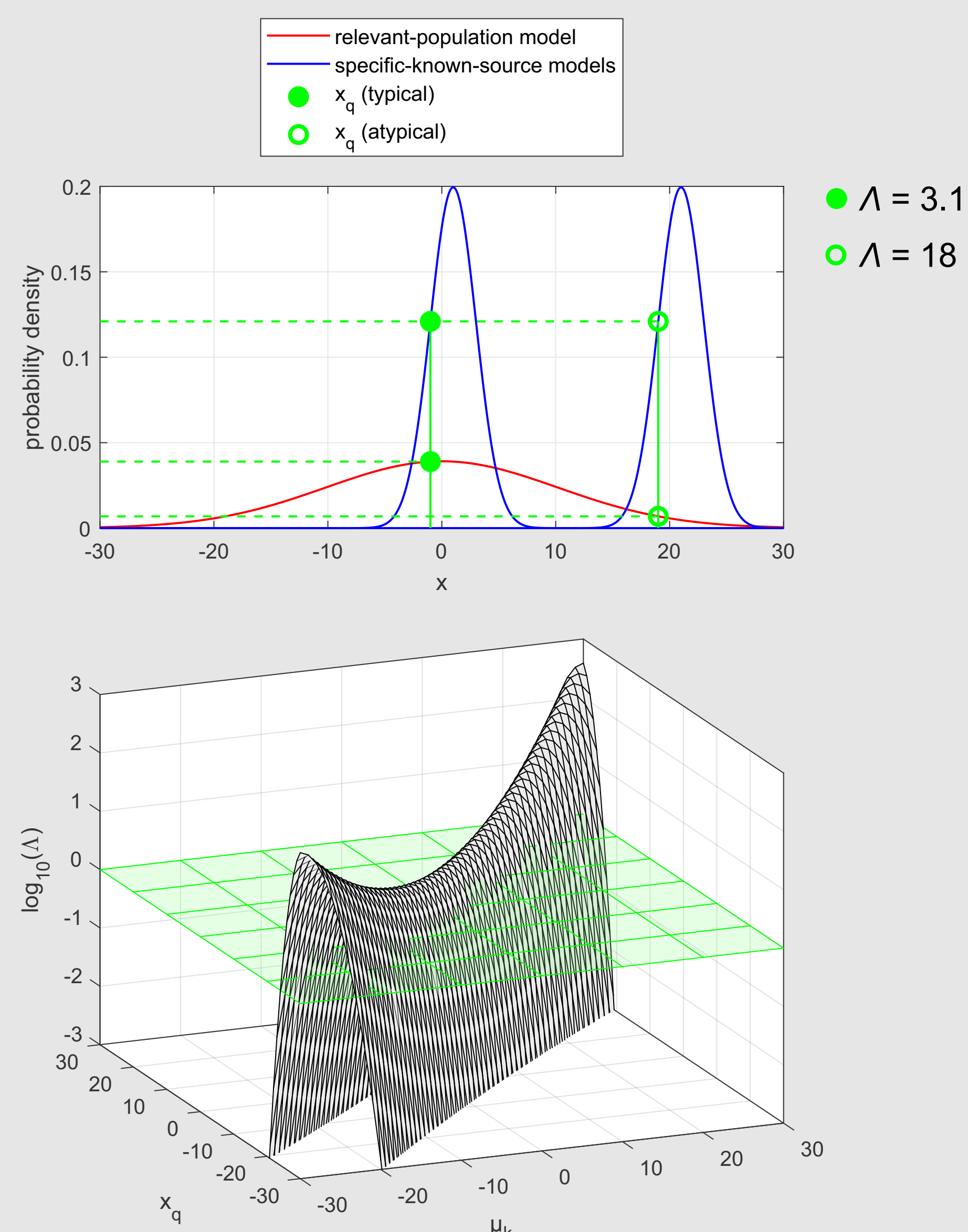


Stop using similarity-score-based likelihood ratios



Specific-source method

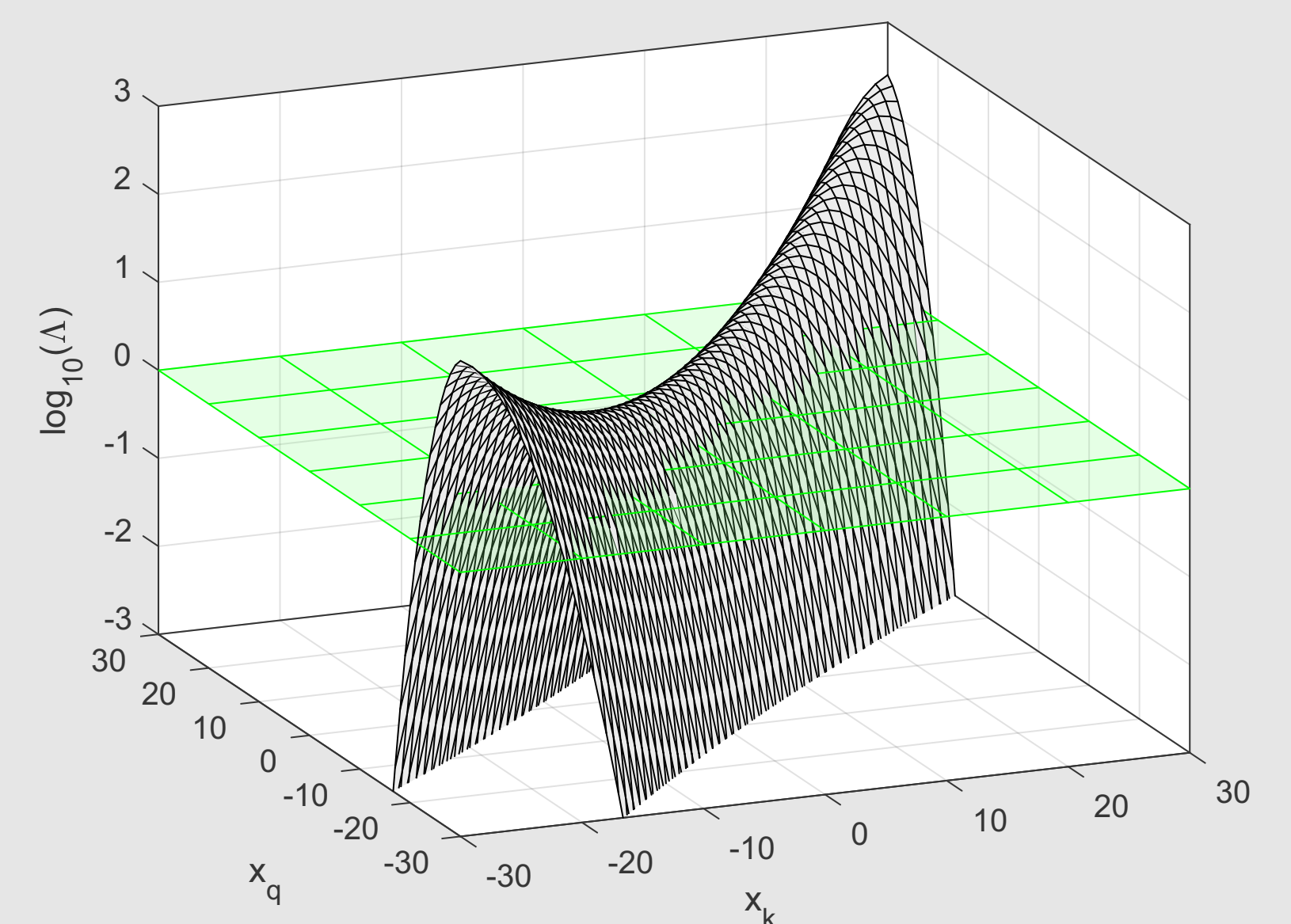
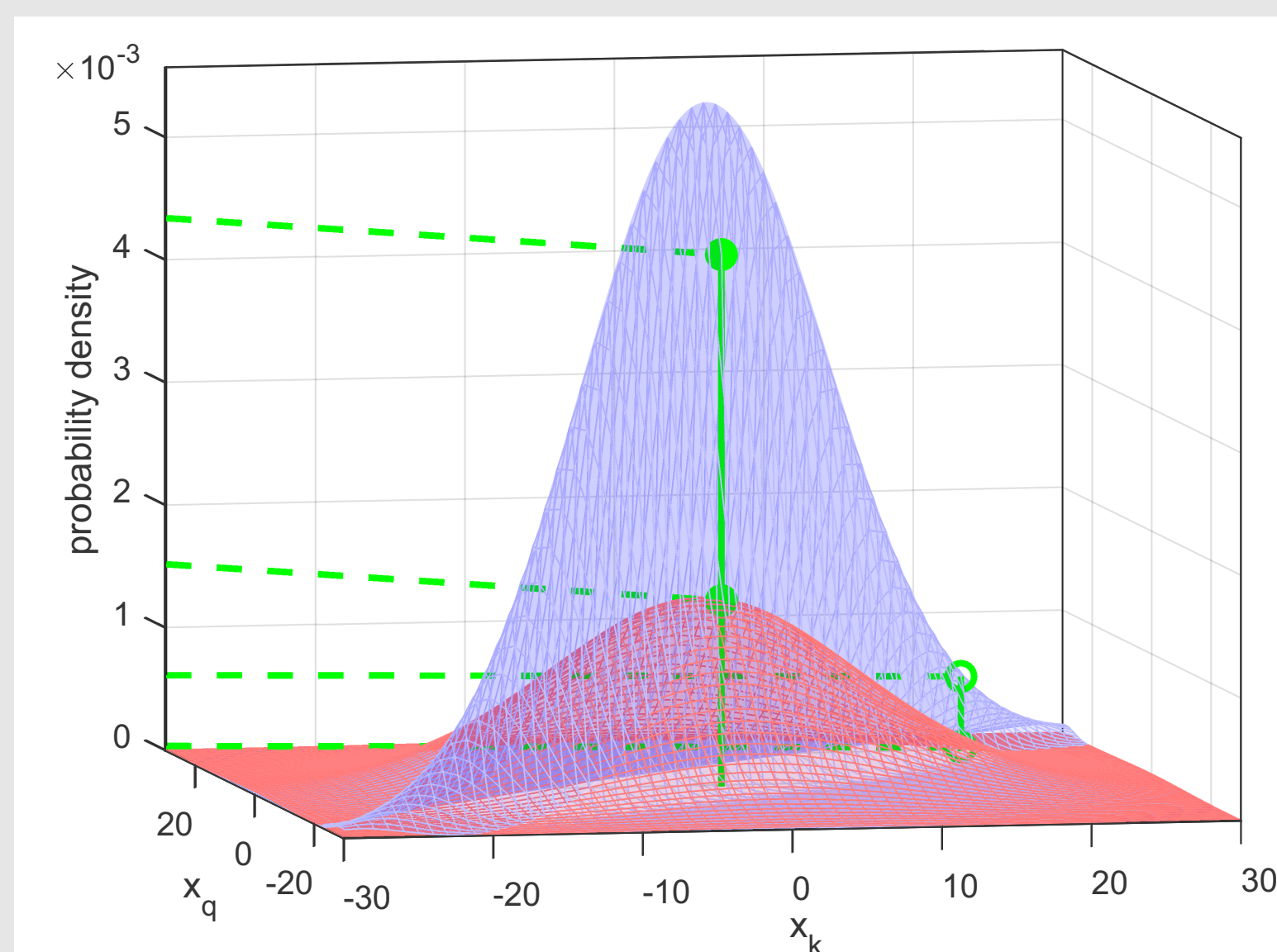
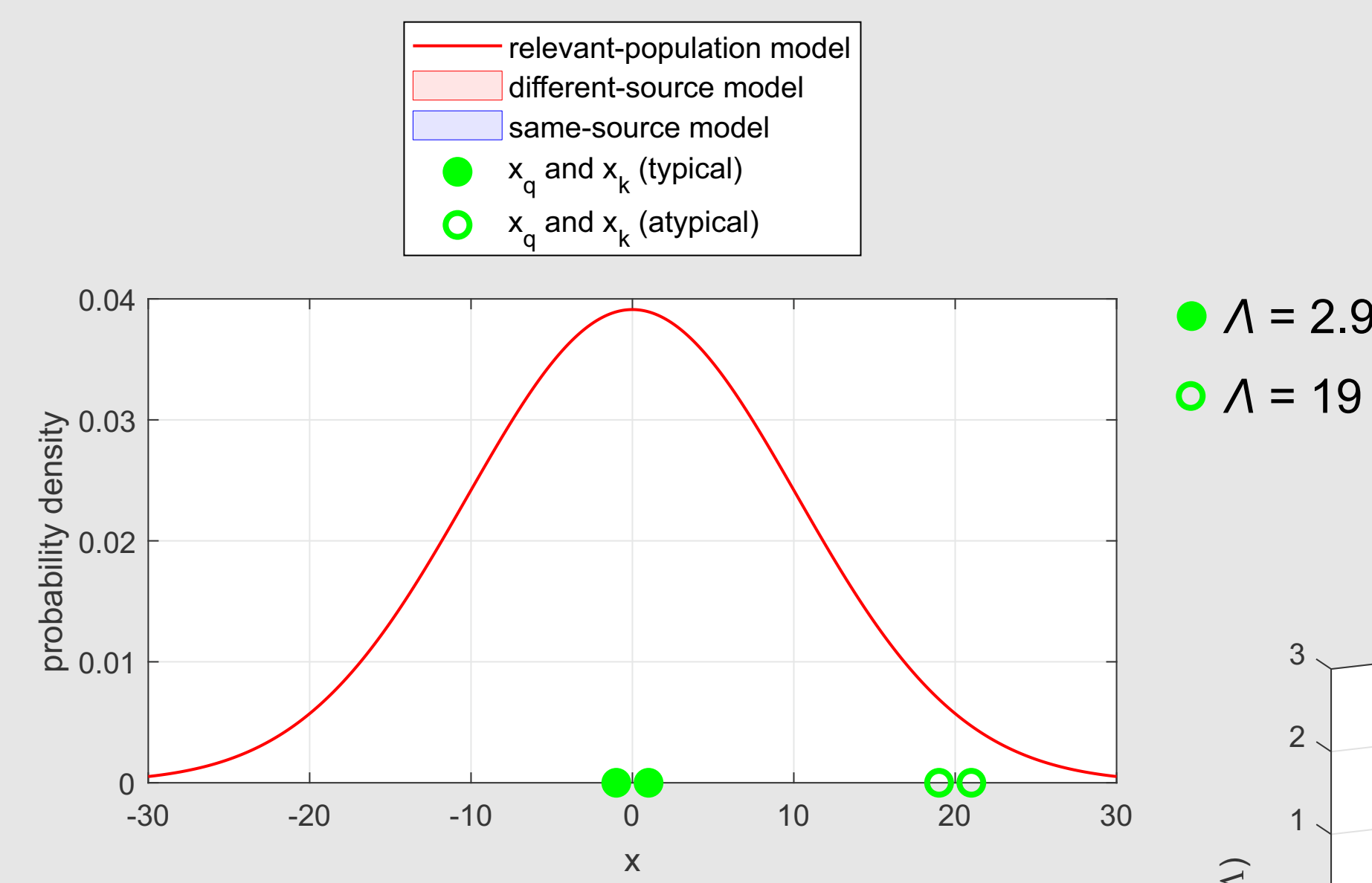
$$\Lambda = \frac{f(x_q|M_k)}{f(x_q|M_r)} \quad \Lambda = \frac{f(x_q|\mu_k, \sigma_w^2)}{f(x_q|\mu_r, \sigma_w^2 + \sigma_b^2)}$$



Takes account of typicality 😊

Common-source method

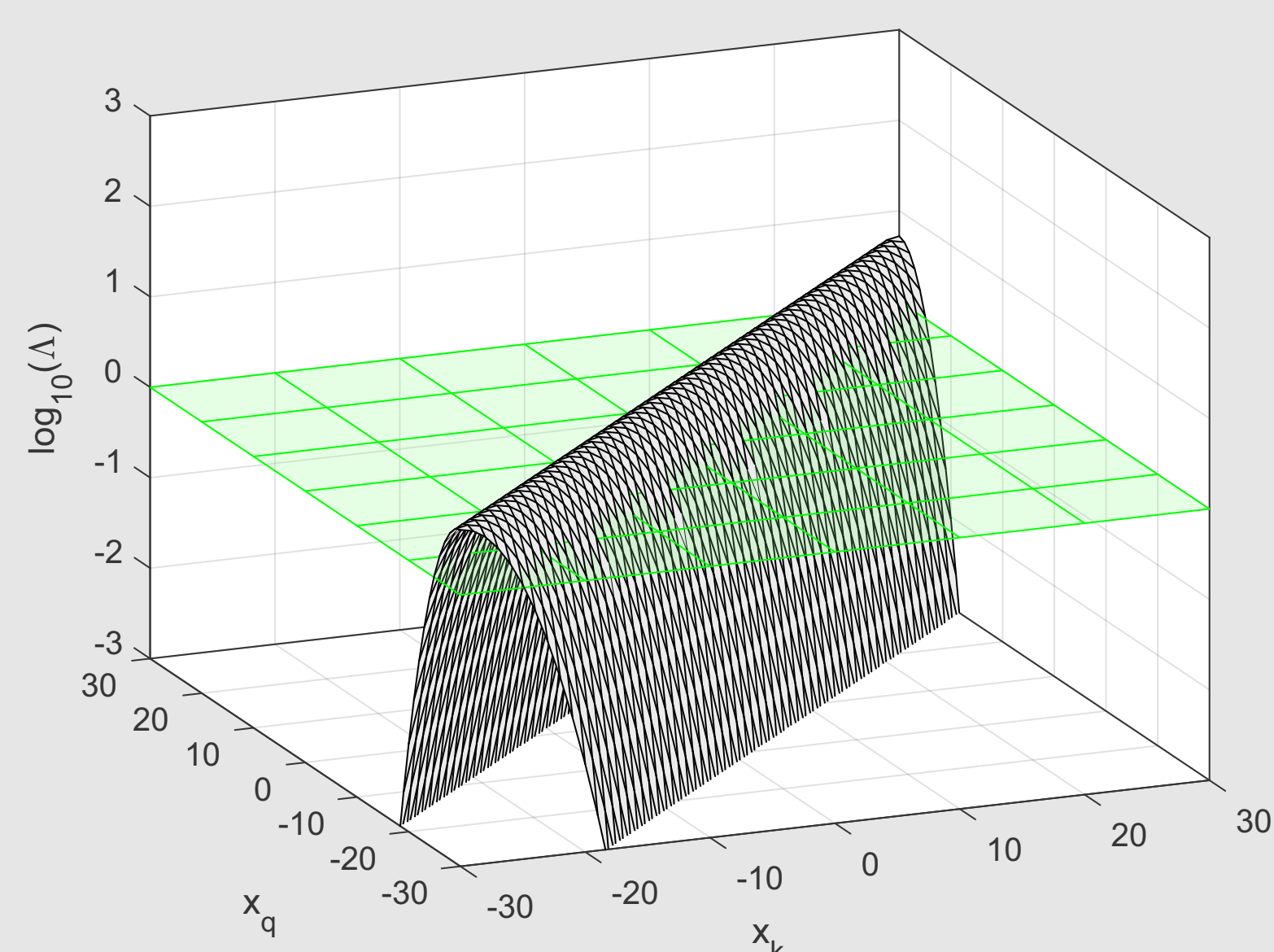
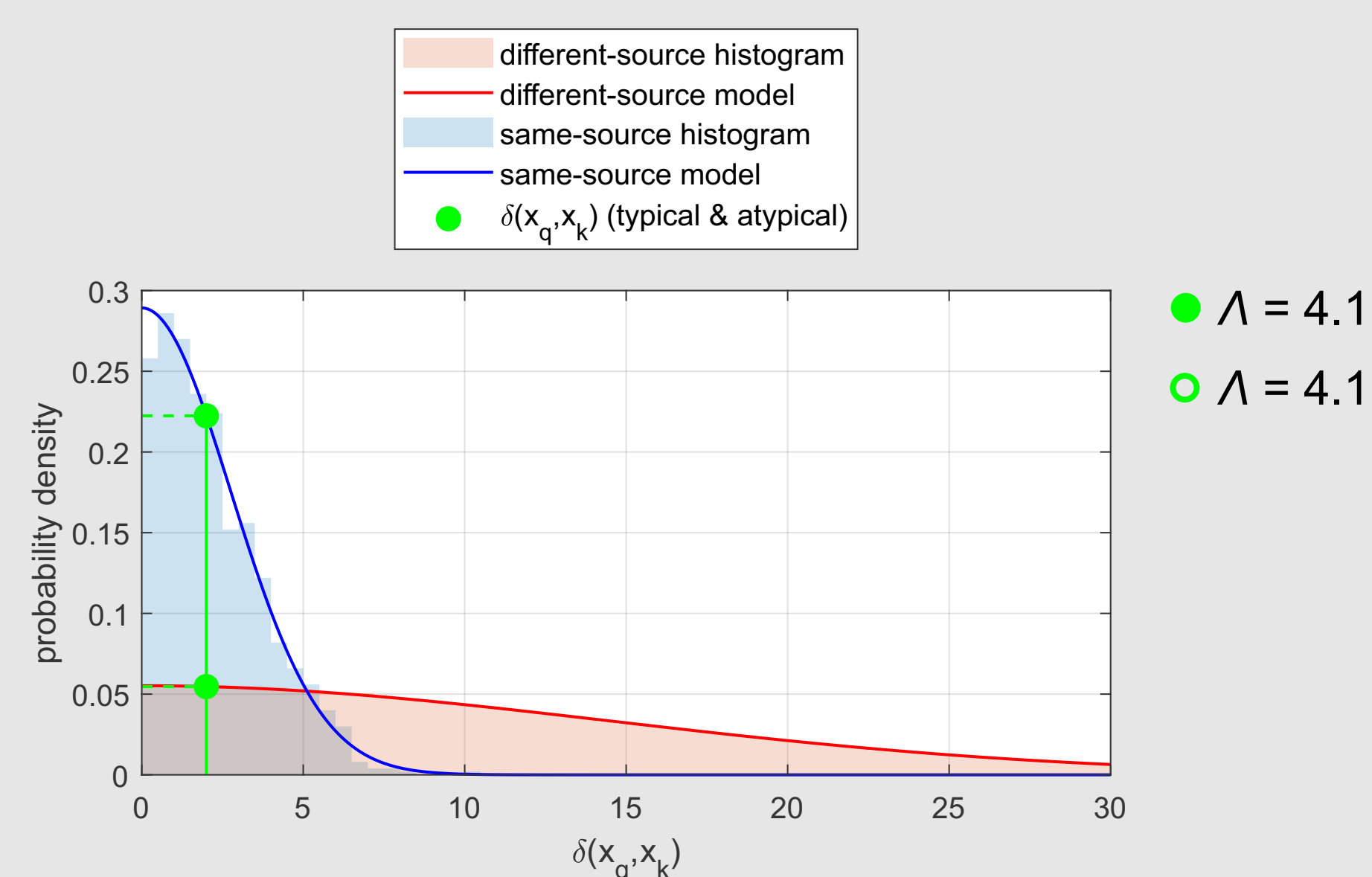
$$\Lambda = \frac{f(x_q, x_k|M_s)}{f(x_q|M_d)f(x_k|M_d)} \quad \Lambda = \frac{f\left(\begin{bmatrix} x_q \\ x_k \end{bmatrix} \middle| \begin{bmatrix} \mu_r \\ \mu_r \end{bmatrix}, \begin{bmatrix} \sigma_w^2 + \sigma_b^2 & \sigma_b^2 \\ \sigma_b^2 & \sigma_w^2 + \sigma_b^2 \end{bmatrix}\right)}{f\left(\begin{bmatrix} x_q \\ x_k \end{bmatrix} \middle| \begin{bmatrix} \mu_r \\ \mu_r \end{bmatrix}, \begin{bmatrix} \sigma_w^2 + \sigma_b^2 & 0 \\ 0 & \sigma_w^2 + \sigma_b^2 \end{bmatrix}\right)}$$



Takes account of typicality 😊

Similarity-score method

$$\Lambda = \frac{f(\delta(x_q, x_k)|M_{\delta,s})}{f(\delta(x_q, x_k)|M_{\delta,d})} \quad \delta(x_q, x_k) = |x_q - x_k|$$



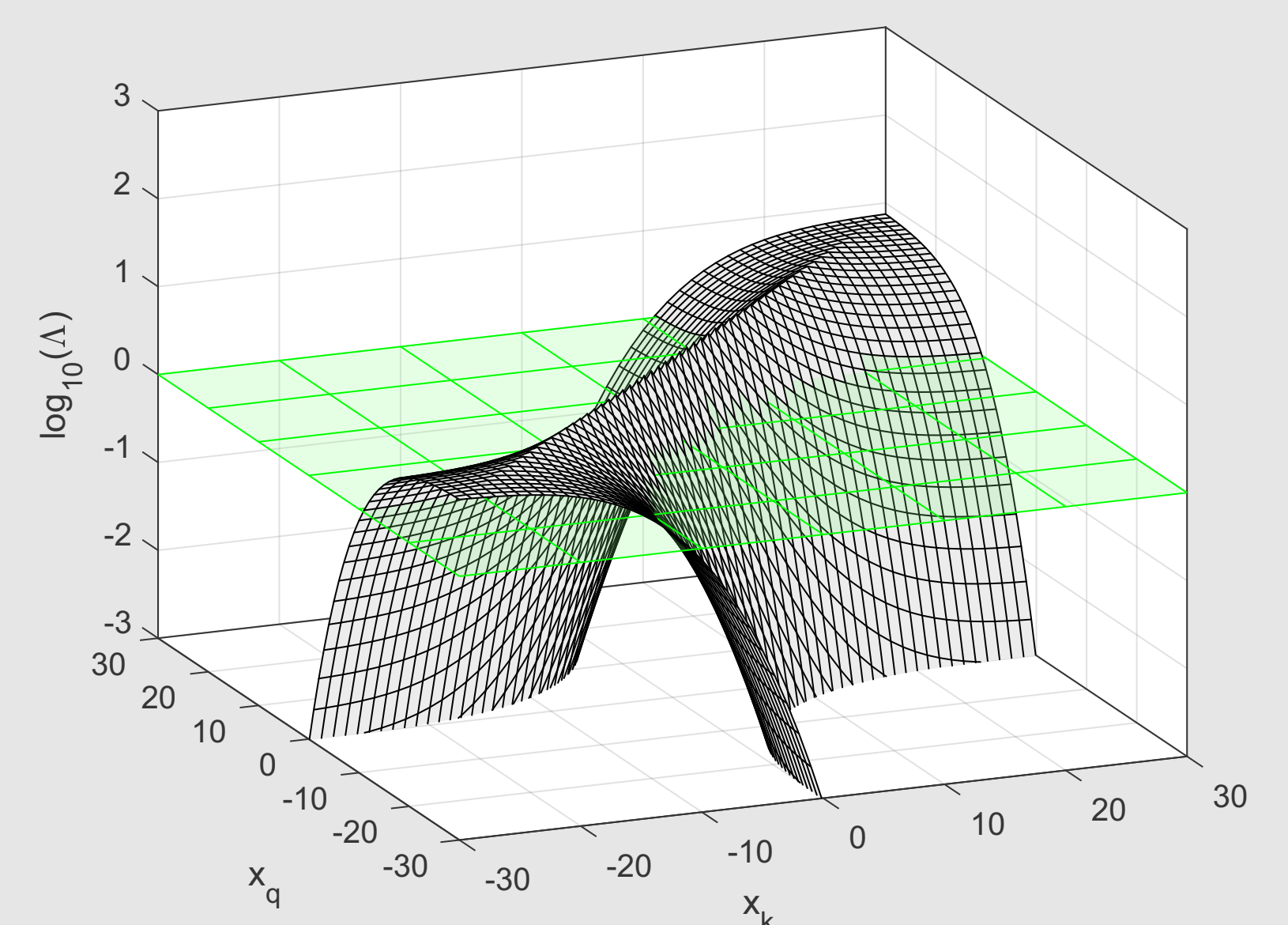
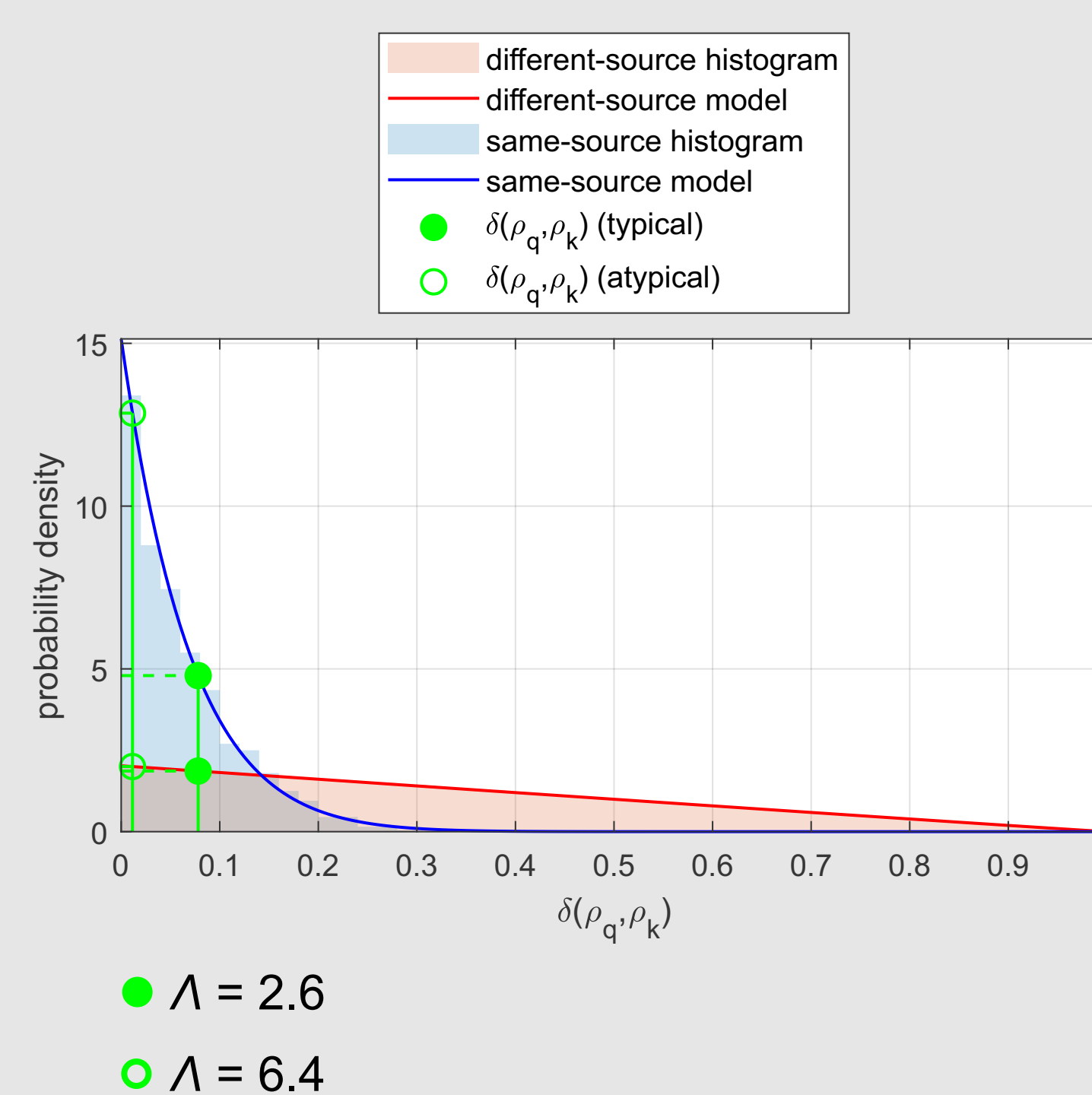
Does not take account of typicality ☹️

Rank-similarity method

$$\Lambda = \frac{f(\delta(\rho_q, \rho_k)|M_{\delta,s})}{f(\delta(\rho_q, \rho_k)|M_{\delta,d})}$$

$$\delta(\rho_q, \rho_k) = |\rho_q - \rho_k|$$

$$\rho = F(x|\mu_r, \sigma_w^2 + \sigma_b^2)$$



Does not properly take account of typicality ☹️

