2. **s-wave scattering resonances**

   Consider low-energy scattering of particles of mass $m$ on a spherically symmetric, attractive square well potential: $V(r) = -V_0 < 0$ for $r \leq R$ and $V(r) = 0$ for $r > R$. The particles have a low fixed incident energy $E$, such that $E \ll \hbar^2/2mR^2$. Analyze the dependence of the total scattering cross-section $\sigma$ on the depth of the potential $V_0$. Make a sketch of the behavior of the cross-section $\sigma(V_0)$ as a function of $V_0$, and calculate the location (in $V_0$) and height of any prominent features.