We prove local existence and uniqueness of solutions for the one-dimensional nonlinear Schrödinger (NLS) equations
\[ iu_t + u_{xx} \pm |u|^2 u = 0 \]
in classes of smooth functions that admit an asymptotic expansion at infinity in decreasing powers of \( x \). We show that an asymptotic solution differs from a genuine solution by a Schwartz class function which solves a generalized version of the NLS equation. The latter equation is solved by discretization methods. The proofs closely follow previous work done by the author and others on the Korteweg-De Vries (KdV) equation and the modified KdV equations. (Received September 22, 2009)