HW7:

1. **Nonlinear waves: short waves limit.** One dimensional dynamics of nonlinear waves in the limit of short waves can be described in terms of nonlinear Schroedinger equation:

$$i\frac{\partial\psi}{\partial t} + \frac{1}{2}\frac{\partial^2\psi}{\partial x^2} + |\psi|^2\psi = 0.$$

Galilean transformation $t \mapsto t, \quad x \mapsto x - vt$ converts solution of this equation in a following way:

$$\psi(t,x) \mapsto \psi(t, x-vt)\exp\left[i\left(\frac{v^2}{2}t + v(x-vt)\right)\right].$$

Write solitary wave solution ($v = 0$) with amplitude $A = 1$, and using Galilean transformation find solitary wave solution for $v = 1$.