
Partial Differential Equations and Modelling

Sheet Nr. 11

Due: 18/20.07.2017

Exercise 1

Let V be compactly supported and square integrable. Use the Jost solutions u to

$$-u'' + Vu = \lambda u, \quad \lambda > 0,$$

(which are defined by $u(x) = e^{-i\sqrt{\lambda}x}$ for x left of the support of V) to show that the scattering matrix at energy λ is unitary.

Exercise 2

Compute the scattering matrix at energy λ of

$$\psi \rightarrow -\psi'' + g\delta$$

where δ is the Dirac measure and $g \in \mathbb{R}$.