Sheet 10

Exercise 10.1

Let $A = \frac{\mathrm{d}}{\mathrm{d}x}$ with $D(A) = H^1(\mathbb{R})$.

a) Show that A is maximal dissipative.

b) Show that for $u_0 \in L^2(\mathbb{R})$

$$(e^{At} u_0)(x) = u_0(x + t).$$

c) Determine the spectrum of $T(t) = e^{tA}$ and its decomposition into σ_p, σ_c, σ_r.