

**Problem 21 (Fourier transform)**

The Fourier transform of a locally compact commutative group  $G$  is defined as

$$\begin{aligned}\hat{f}(\chi) &= \int_G f(g)\chi(g)dg \\ f(g) &= \int_{\hat{G}} \hat{f}(\chi)\chi(\bar{g})d\chi.\end{aligned}$$