The elements $\psi$ and $(e-\psi\psi)w$ implement the equivalences

$$p \sim \psi\psi \quad \text{and} \quad f - p \sim e - \psi\psi.$$

Now it follows from Lemma 1 that $f \sim e$.

Von Neumann algebras, $W^*$-algebras, $AW^*$-algebras and Baer rings are examples of rings with a complete lattice of projections.

The author wishes to express his appreciation to Bernie Russo whose seminar inspired this paper.

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ON THE FOURIER INVERSION THEOREM FOR $R^1$

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The following is an elementary "noncomputational" proof of the Fourier inversion theorem for tempered distributions on $R^1$. The proof does not generalize so easily to $R^n$, but the inversion theorem for $R^n$ can be deduced from that for $R^1$.

To get the inversion theorem for tempered distributions it is sufficient, by duality, to have a proof for the space $\mathcal{D}$ of test functions (i.e. functions $\phi \in C^\infty$ such that $\phi^{(m)}(x) = O(|x|^{-N})$ for all $m$, $N \geq 0$ as $x \to \pm \infty$). It is also sufficient to consider only the point $x = 0$.

**Theorem.** There exists a universal constant $K$ such that

$$(1) \quad \int_{-\infty}^\infty \hat{\phi}(t)dt = K\phi(0) \quad \text{for all } \phi \in \mathcal{D}.$$

The value of $K$ ($K = 2\pi$) must be determined, as usual, by substituting some particular function $\phi$. By linearity, (1) is equivalent to the following:

$$(2) \quad \phi(0) = 0 \implies \int_{-\infty}^\infty \hat{\phi}(t)dt = 0.$$

**Proof of (2).** Since $\phi(0) = 0$, $\psi(x) \equiv (\phi(x)/x) \in C^\infty$. By direct computation, since $\phi(x) = x\psi(x)$, $\hat{\phi}(t) = i(d/dt)\hat{\psi}(t)$. Then, since $\hat{\psi}$ is also a test function (direct verification), $\int_{-\infty}^\infty \hat{\phi}(t)dt = i[\hat{\psi}(\infty) - \hat{\psi}(-\infty)] = 0$. Q.E.D.

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