

28 → 22.8  
12/4/16

6 שאלות

$L_1(\mathbb{R}) \rightarrow p_1 \quad L_2(\mathbb{R}) \rightarrow p_{103} \quad S(\mathbb{R}) \quad (1)$

$Hf = (\hat{f}(\xi) \operatorname{sign}(\xi))^v \quad \text{כ"כ} \quad H: L_2(\mathbb{R}) \rightarrow L_2(\mathbb{R}), H^2 = I \quad (2)$

$L_2 \rightarrow (Hf)(x) = \frac{1}{\pi} \lim_{\epsilon \rightarrow 0^+} \int_{|y-x| \geq \epsilon} \frac{f(y)}{y-x} dy \quad (2)$

$\hookrightarrow$  (10) (11)  $\hat{f} = \lambda f$   $\Leftrightarrow$   $f \in L_2(\mathbb{R})$   $\forall \lambda \in \mathbb{C} \quad (3)$

(10)  $\cdot H_\lambda = \{f \in L_2(\mathbb{R}) \mid \hat{f} = \lambda f\} \quad \text{כ"כ} \quad \lambda \in \{\pm 1, \pm i\}$   
 $\cdot L_2(\mathbb{R}) = H_1 \oplus H_{-1} \oplus H_i \oplus H_{-i} \quad \text{כ"כ}$

$f_t(x) = f(x+t) \quad \text{כ"כ} \quad f \in L_2(\mathbb{R}) \quad (10) \quad (4)$   
 $\hat{f}_t = e^{it\xi} \hat{f} \quad \text{כ"כ}$

$A: L_2(\mathbb{R}) \rightarrow L_2(\mathbb{R}) \quad \text{כ"כ} \quad (2)$   
 $(Af)_t = A(f_t) \quad t \in \mathbb{R} \quad \text{כ"כ}$

$\hookrightarrow$  (10) (11)  $\cdot (x \text{ חסר } \text{ או } \text{ פרט } A, \text{ כ"כ})$   
 $(Af)^{\wedge} = a \hat{f} \quad \text{כ"כ} \quad a \in L_\infty(\mathbb{R}) \quad \text{כ"כ}$

$f(x) = \begin{cases} \cos^2 \frac{\pi x}{2} & |x| \leq 1 \\ 0 & |x| > 1 \end{cases} \quad \text{כ"כ} \quad (5)$

$f(x) = \max(0, 1-|x|) + \frac{\sin^2(\pi x)}{(\pi x)^2} \quad (2)$

$\mathcal{X}_R = \{f \in L_2(\mathbb{R}) \mid \operatorname{supp} f \subset [-R, R]\} \quad \text{כ"כ} \quad (6)$

$\max\{\|f'\|_2 \mid f \in \mathcal{X}_R, \|f\|_2 = 1\} < \infty \quad \text{כ"כ} \quad (10)$

$L_2(\mathbb{R}) \rightarrow \text{כ"כ} \quad \exists \text{כ"כ} - \{f \in \mathcal{X}_R, \|f\|_2 = 1\} \quad (2)$