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$$L_2^{\text{even}} = \{ f \in L_2, f(-x) = f(x) \} \quad (1)$$

פונקציות בסיסיות:  $1, \sqrt{2} \cos x, \sqrt{2} \cos 2x, \dots$   
 $f(x) = \hat{f}(0) + \sum_{n=1}^{\infty} (\hat{f}(n) + \hat{f}(-n)) \cos nx$   
 $f \in L_2^{\text{even}}$  בס (2)  $L_2^{\text{even}}$  -2

$$\| f - \sum_{|j| \leq n} \hat{f}(j) e_j \|_2 = \frac{C_f}{n^{k-1/2}} \quad f^{(k)} \in L_2, k \geq 1 \quad (2)$$

$$\sum_{|j| \leq n} e_j(x) \overline{e_j(y)} = \frac{\sin(\pi(2n+1)(x-y))}{\sin(\pi(x-y))} \quad (3)$$

$$\min \left\{ \int_0^1 |f'(x)|^2 dx \mid f = \sum_{|k| \leq n} c_k e_k, f'(z) = 1 \right\} \quad n \in \mathbb{N} \quad (4)$$

$$f(x) = \sqrt{x^2 - 1} \quad (5)$$

$$S(x) = \sum_{n=1}^{\infty} \frac{1}{n^2} = \frac{\pi^2}{6} \quad (6)$$

$$S(y) = \sum_{n=1}^{\infty} \frac{1}{n^4} = \frac{\pi^4}{90} \quad (7)$$

$$f' \in L_2, f \in C(\mathbb{T}), \int_0^1 f(x) dx = 0 \quad (8)$$

$$\int_0^1 |f'(x)|^2 dx = 4\pi^2 \int_0^1 |f'(w)|^2 dx$$