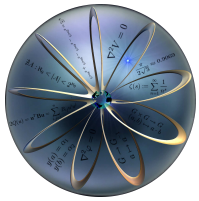

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Riesz-Fischer theorem

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Let $\{e_n\}$ be an orthonormal basis for a (real or complex) infinite-dimensional Hilbert space $\mathcal{H}$. If $\{c_n\}$ is a sequence of (real or complex) numbers such that $\sum |c_n|^2$ converges, then there is an $x \in \mathcal{H}$ such that $x = \sum_{n=1}^{\infty} c_n e_n$, and $c_n = \langle x, e_n \rangle$.