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## Riesz representation theorem

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For every continuous linear functional  $f$  on a Hilbert space  $\mathcal{H}$ , there is a unique  $u \in \mathcal{H}$  such that  $f(x) = \langle x, u \rangle$  for all  $x \in \mathcal{H}$ .  
Note:  $\langle x, u \rangle$  denotes the inner product between  $x$  and  $u$ .