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# A Hilbert Space Structure of the Space of Symmetric Polynomials on $\ell_1$

A polynomial $P$ on $\ell_1$ is said to be *symmetric* if $P(x)$ is invariant under actions of permutations operators $A_\sigma$

$$x = \sum_{k=1}^{\infty} x_k e_k \mapsto A_\sigma(x) = \sum_{k=1}^{\infty} x_k e_{\sigma(k)}$$

$\forall x \in \ell_1$, where $\sigma$ is a permutation on the set of positive integer numbers.

We consider the completion $H_s(\ell_1)$ of the space $\mathcal{P}_s(\ell_1)$ of all symmetric polynomials on $\ell_1$ with respect to a natural Hilbert norm and investigate properties of $H_s(\ell_1)$.