



## Approximation by crystal invariant subspaces

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**Abstract:** In this talk we will look at approximation properties of spaces invariant under the action of a crystal group. We show how to characterize these spaces by a property of the range function. Using this fact and the results for shift invariant spaces, we show how to solve the following problem: Let  $\mathcal{F} := \{f_1, \dots, f_m\}$  (the data) be given vectors of a Hilbert space  $\mathcal{H}$ . Which is the crystal invariant subspace  $S \subset \mathcal{H}$  of  $k$  generators that minimizes the error to the data, in the sense that

$$\sum_{i=1}^m \|f_i - P_S(f_i)\|^2$$

is minimal, where  $P_S$  is the orthogonal projection onto  $S$ . This provides a rotational invariant model for images.