İSTANBUL ANALYSIS SEMINARS

Runge Tubes

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Abstract: It has been a long standing open question whether it is possible to embed $\mathbb{C}^* \times \mathbb{C}$ as a Runge domain into $\mathbb{C}^2$, i.e., such that every holomorphic function on the domain can be approximated by holomorphic polynomials. This question arose in the early 1990s in connection with the classification of Fatou components of holomorphic automorphisms. I will present a simple proof of a considerably more general result. A special case is that if X is a Stein manifold and $f : X \to \mathbb{C}^n$ is a proper holomorphic embedding for some $n > 1$, then f can be approximated by holomorphic Runge embeddings of the total space of the normal bundle of f into $\mathbb{C}^n$. If in addition X is an affine manifold, f is a polynomial embedding and $n > dim(X) + 1$, then f extends to a holomorphic Runge embedding of its normal bundle. (This is joint work with E. F. Wold, University of Oslo).

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