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Polynomial approximation, local polynomial convexity, and degenerate CR singularities

This talk will present a few advances on some earlier work on the following question: when is a smooth real surface $S \subset \mathbb{C}^2$ locally polynomially convex at a point $p \in S$? This question is complicated by the presence of points in the surface S that have complex tangents. Such points are called CR singularities. Let $p \in S$ be a CR singularity at which the order of contact of the tangent plane with S is greater than 2; *i.e.*, a degenerate CR singularity. We will discuss a sufficient condition for S to be locally polynomially convex at a degenerate CR singularity. In demonstrating this sufficient condition, we will need a new result about the uniform algebra on a closed disc in \mathbb{C} generated by z and a complex-valued continuous function F . This result may be of independent interest because the function F here is allowed to be non-smooth; this result may thus be viewed as a Mergelyan-type theorem for complex-valued F .