Polynomial meshes on algebraic hypersurfaces

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Polynomial meshes (called sometimes 'norming sets') are nearly optimal for uniform least squares approximation and contain interpolation sets nearly as good as Fekete points of the domain. They play a relevant role in recent multivariate interpolation and approximation. Optimal meshes have been constructed by different analytical and geometrical techniques on many polynomially determining compact sets. Regarding subsets of algebraic varieties polynomial meshes are known only for a few compacts like sections of a sphere, a torus, a circle and curves in $\mathbb{C}$ with analytic parametrization. In these cases, polynomial meshes are transferred by some analytical map from certain polynomially determining set with sufficiently relevant meshes. We give a general construction of polynomial weakly admissible meshes on compact subsets of arbitrary algebraic hypersurfaces in $\mathbb{C}^{N+1}$. They are preimages by a projection of meshes on compacts in $\mathbb{C}^N$. These meshes are optimal in some cases. We present also partial results for algebraic sets of codimension greater than one. We give some examples of optimal polynomial meshes and weakly admissible meshes on compact subsets of algebraic sets.