

A Note on the multiplicity of the distinguished points

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For an isolated multiple zero z_0 of a polynomial system P with multiplicity m , various methods can be used to calculate the multiplicity structure. If we consider a perturbed system $P_t(x) = P(x) + tC$, where C is a generic constant vector, it can be shown that the zero set of P_t near z_0 can be expressed as Puiseux Series with m branches. Now, suppose that V is a k -dimensional zero manifold of P and $z_0 \in V$ is such that for “almost all” generically perturbed system \tilde{P} of P , there are the same number of isolated zeros of \tilde{P} near z_0 . This kind of points are called distinguished points of P (the name is adopted from the book “*Numerical Polynomial Algebra*” by H. Stetter). In this note, we will define the multiplicity of such points in terms of Puiseux Series and give the related deflation needed to reveal the multiplicity.