REAL IDENTIFIABILITY AND COMPLEX IDENTIFIABILITY

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ABSTRACT. A tensor T of rank k is *identifiable* when it has a unique decomposition in terms of rank-1 tensors. There are cases in which the identifiability fails over $\mathbb{C}$, for general tensors of fixed rank. The failure, often, is due to the existence of an elliptic normal curve through general points of the corresponding variety of rank-1 tensors.
After a brief introduction to the subject, we prove the existence of non-empty euclidean open subsets of some varieties of real k-rank tensors, whose elements have 2 complex decompositions, but are identifiable over $\mathbb{R}$.
Moreover we provide examples of non-trivial euclidean open subsets in certain spaces of symmetric tensors and of almost unbalanced tensors, whose elements have real rank equal to the complex rank and are identifiable over $\mathbb{R}$ but not over $\mathbb{C}$. On the contrary, there are examples of tensors of given real rank, for which identifiability over $\mathbb{R}$ can't hold in non-trivial open subsets.
These results have been obtained in collaboration with Cristiano Bocci and Luca Chiantini.