

Recent Results on Hypersurfaces in $\mathbb{C}P^2$ and $\mathbb{C}H^2$

Patrick J. Ryan

McMaster University
Hamilton, Ontario, Canada
April, 2007

Abstract

There are many classification theorems for hypersurfaces M^{2n-1} in the complex projective space $\mathbb{C}P^n$ and the complex hyperbolic space $\mathbb{C}H^n$. The most prominent model spaces are the homogeneous Hopf hypersurfaces catalogued by R. Takagi for $\mathbb{C}P^n$ and S. Montiel for $\mathbb{C}H^n$. The case $n = 2$ has proven to be more challenging than the higher dimensional ones. For example, all pseudo-Einstein hypersurfaces are known to belong to the lists of Takagi or Montiel when $n \geq 3$. It turns out that this is not true for $n = 2$. We will discuss recent results and open questions concerning hypersurfaces in $\mathbb{C}P^2$ and $\mathbb{C}H^2$, with emphasis on comparison with the $n \geq 3$ case.