
Edward Crane

Extremal Polynomials in Smale's Mean Value Conjecture

CMFT 6 No.1 (2006), 145–163. [ISSN 1617-9447]

Abstract. Let p be a non-linear complex polynomial in one variable. Smale's mean value conjecture is a precise estimate of the derivative $p'(z)$ in terms of the gradients of chords between z and a stationary point on the graph of p . The problem is to determine the correct constant in the estimate, but despite the apparent simplicity of the problem only a small amount of progress has been made since Stephen Smale first posed it in 1981. In this paper we establish the existence of extremal polynomials for Smale's mean value conjecture, and establish a geometric property of the extremals.

Keywords. Complex polynomials, critical points, minimax problems.

2000 MSC. Primary 26C10; Secondary 30C15, 49J35.

Received. November 21, 2005.