RESEARCH ANNOUNCEMENTS

The purpose of this department is to provide early announcement of significant new results, with some indications of proof. Although ordinarily a research announcement should be a brief summary of a paper to be published in full elsewhere, papers giving complete proofs of results of exceptional interest are also solicited.

A TOPOLOGICAL PROOF OF THE CONTINUITY OF THE DERIVATIVE OF A FUNCTION OF A COMPLEX VARIABLE

BY ROBERT L. PLUNKETT[1]

Communicated by R. H. Bing, September 30, 1958

In this paper the continuity of the derivative of an analytic function of a complex variable is proved in an elementary, or purely topological, fashion. That is, no use whatever is made of complex integration or equivalent tools. The desirability of such a proof has been emphasized in *Complex analysis* by L. V. Ahlfors [**1**, p. 82], and even more recently in *Topological analysis* by G. T. Whyburn [**2**, p. 89]. Our proof has been made accessible only by the extensive modern development of the subject of topological analysis (see [**2**] for rationale and bibliography). The author wishes to express his appreciation to Professor G. T. Whyburn for suggesting the feasibility of attacking this problem at this time.

Throughout, we shall be concerned with a nonconstant complex valued function $f(z)$ defined and having a finite derivative at each point of an open connected set E of the complex plane. We shall employ Theorems A and B in the proof of the main theorem.

THEOREM A. *A necessary and sufficient condition that f be a local homeomorphism at $z_0 \in E$ is that $f'(z_0)$ be not zero* [**2**, p. 85].

THEOREM B. *If A and B are 2-manifolds without edges and $f(A) = B$ is a light open mapping, then for any $y \in B$ and $x \in f^{-1}(y)$, there exist 2-cell neighborhoods U of x and V of y such that $f(U) = V$ and the mapping f of U onto V is topologically equivalent to a power mapping $w = z^k$ on $|z| \leqq 1$, for some positive integer k* [**2**, p. 88].

We shall also use Rouché's theorem [**2**, p. 93], and the lemmas which follow the next definition.

DEFINITION. *Let $\{z_i\}$ be a sequence of points of E. A sequence $\{\bar{z}_i\}$ of*

[1] This work was supported by a Summer Research Award from the Research Council of the Florida State University.