W. F. Pfeffer, Department of Mathematics, University of California - Davis, Davis, California 95616

ON THE FUNDAMENTAL THEOREM OF CALCULUS

Elaborating on the ideas of Henstock and Kurzweil, we define a well-behaved Riemann type integral in $\mathbb{R}^m$ which is independent of the affine structure of $\mathbb{R}^m$ and, consequently, is suitable for integrating on differentiable manifolds. The following version of the Fundamental Theorem of Calculus is proved.

THEOREM *Let M be a compact oriented m-dimensional C^1 manifold with boundary ∂M, and let w be a continuous $(m-1)$-form on M. If w is differentiable in $M - \partial M$, then dw is integrable over M and*

$$\int_M dw = \int_{\partial M} w \ .$$