Current Valued Measures and Area
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If f is a continuous mapping of finite k-dimensional Geöcze area from a polyhedral region $X \subset \mathbb{R}^k$ into $\mathbb{R}^n$ and if either $k = 2$ or $\mathcal{H}_n^{k+1}(f(X)) = 0$, then one can associate with f, by means of the Cesari-Weierstrass integral, a current valued measure T on the middle space M_f of f whose total variation with respect to mass is the Geöcze area of f and which possesses, with respect to k-dimensional Hausdorff measure over M_f, a density-function whose values are simple k-vectors with integer norms. These k-vectors describe the tangential properties of f, while their norms are the multiplicities with which f assumes its values in $\mathbb{R}^n$. By comparing T with the the current-valued measure over M_f (related to Lebesgue area) whose existence was shown by H. Federer under the same assumptions on k and n, we can deduce that the Lebesgue and Geöcze areas of f coincide.