Rhodes, Frank; **Thompson, Christopher L.**
Rotation numbers for monotone functions on the circle. (English) Zbl 0623.58008
J. Lond. Math. Soc., II. Ser. 34, 360-368 (1986).

Several results on rotation numbers for noncontinuous functions are obtained. Let $\mathcal{M} = \{F : \mathbb{R} \to \mathbb{R} |$ F is nondecreasing and $F(t+1) \equiv F(t)+1\}$, $\mathcal{L} = \{F \in \mathcal{M} |$ F is strictly increasing$\}$. Theorem 1. If $F \in \mathcal{M}$ then ρ (F)$\equiv \lim_{n\to\infty} F^n(x)/n$ exists for all $x \in \mathbb{R}$ and is independent of x.

Two functions F,G$\in \mathcal{M}$ are called equivalent iff they are equal except at a countable set of points (of discontinuity). Theorem 3. Let $F \in \mathcal{L}$, and p,q$\in \mathbb{Z}$ with $q > 0$. Then $\rho(F) = p/q$ iff there is a function $K \in \mathcal{L}$ which is equivalent to F and is such that $K^q(x_0) = x_0 + p$ for some $x_0 \in \mathbb{R}$.

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