ABSTRACT. Suppose k_n denotes either $\phi(n)$ or $\phi(p_n)$ $(n = 1, 2, \cdots)$ where the polynomial ϕ maps the natural numbers to themselves and p_k denotes the k^{th} rational prime. Let $(\frac{r_n}{q_n})_{n=1}^{\infty}$ denote the sequence of convergents to a real number x and define the the sequence of approximation constants $(\theta_n(x))_{n=1}^{\infty}$ by

$$\theta_n(x) = q_n^2 \left| x - \frac{r_n}{q_n} \right|. \qquad (n = 1, 2, \cdots)$$

In this paper we study the behaviour of the sequence $(\theta_{k_n}(x))_{n=1}^{\infty}$ for almost all x with respect to Lebesgue measure. In the special case where $k_n = n$ $(n = 1, 2, \cdots)$ these results are due to W. Bosma, H. Jager and F. Wiedijk.