1014-42-1078 **J. Marshall Ash*** (`mash@math.depaul.edu`), Department of Mathematics, Chicago, IL 60614.

An integral estimate involving the Dirichlet kernel.

The estimate $\int_{\mathbb{T}^2} |D_P(X)|\, dX \ll k \ln^2 N$, where $\mathbb{T}^2 = [-1/2, 1/2]^2$ is the 2-torus, $D_P(X) = \sum_{n\in P\cap\mathbb{Z}^2} e(n\cdot X)$ is the Dirichlet kernel associated to P, a k-sided polygon contained in a disk of radius N, and $e(x) = e^{2\pi i x}$, was established in [A. A. Yudin and V. A. Yudin, Polygonal Dirichlet kernels and growth of Lebesgue constants, Translated from Matematicheskie Zametki, **37**(1985), 220–236]. Yudin and Yudin's work can be modified to show that $\int_{\mathbb{T}^2} |D_P(X)|^p\, dX \ll kN^{2p-2}$, where $p > 1$.(See http://condor.depaul.edu/˜ mash/YudinLp.pdf for this.) The hardest step of the modification requires the estimate

$$\int_{\mathbb{T}^2} |y|^{-p} |D(x-y) - D(x)|^p \, dydx \ll N^{2p-2},$$

where $D(x) = \sum_{n=0}^{N} e(nx)$ is the one dimensional Dirichlet kernel. We will do this latter estimate here. (Received September 27, 2005)