ICM 1998, Berlin, Aug. 18–27

Abstracts of Short Communications and Posters

Section:

8. Analysis

1991 MS Classification: 42, 43, 44
Pandey, Jagdish N., Carleton University, Ottawa, Canada
The Hilbert Transform of Almost Periodic Functions and Distributions
Let B^{ac}_{ap} be the space of infinitely differentiable almost periodic functions defined on R closed with the operations of differentiation and Hilbert transformation, and metrized by the scalar product $(f,g) = M\{f(t)\overline{g(t)}\}$. It is shown that an arbitrary $f \in (B^{ac}_{ap})'$ is a finite linear combination of finite order distributional derivatives of elements of the completion of B^{ac}_{ap} and that the Schwartz space of almost periodic distributions is contained in $(B^{ac}_{ap})'$. The Hilbert transform Hf of $f \in (B^{ac}_{ap})'$ is defined by the formula $\langle Hf, \phi\rangle = \langle f, -H\phi\rangle \forall \phi \in B^{ac}_{ap}$ leading to the inversion formula $H^2 f = -f$. We use our result to find an almost periodic (in x) harmonic function $U(x,y), x \in R, y > 0$ satisfying $\lim_{y\to 0+} U(x,y) = f, U(x,y) = o(1), y \to \infty$ uniformly $\forall x \in R$. Many other related results are proved.