# ORTHOGONAL SYSTEMS BASED ON GENERALIZED FRANK CONSTRUCTIONS[1]

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The characteristics of orthogonal bases obtained with use of generalization of Frank construction [1, 2] as well as applications of these bases to problems of telecommunications are investigated.

In a space of complex-valued $N$-periodic signals with $N = n^2$, two infinite sets of signals, $V_1$ and $V_2$, are constructed. Cyclic and $n$-adic shifts of those signals form orthogonal bases [3]. For effective use of these bases in spread spectrum communication networks when basic signals are treated as an information carrier, the variants of their processing are offered. In order to do this, the block orthogonal bases $\{g_k\}$ and $\{f_k\}$ are formed basing on Frank construction. These bases are oriented to subsampling in time and subsampling in frequency, respectively. It is proved that decomposing signals from $V_1$ on basis $\{g_k\}$ is sufficient for their handling; the same result holds for $V_2$ and $\{f_k\}$. Such decompositions are equivalent to applying series of short (radix $n$) Fourier transforms to signals from $V_1$ and $V_2$.

The notion of autoreversal signals derived from Frank construction is introduced. The features of these signals are studied. It is shown that the procedure of block interleaving, which is used for detection and elimination of grouping errors, can be essentially simplified for these signals.

REFERENCES

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[1]This work is supported by the Russian Foundation for Basic Research (project No. 01-01-00231).