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Coherent Addition of QPSK Signals from Spaced Antennas with Complex Frequency Down-Conversion

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Abstract. Based on the previous studies on the addition of BPSK signals after the complex down-conversion from intermediate to zero frequency, a similar study was carried out for QPSK signals. The main application of this work is the means of receiving information from deep space spacecraft, traditionally using expensive antennas of large diameter. The process of adding signals below the noise level enables the use of antenna fields of many relatively cheap small antennas of equivalent total area instead of very large antennas. The proposed method of adding QPSK signals made it possible to significantly reduce the sampling frequency and complexity of digital processing required for ensuring the coherence of the samples of the added signals compared to the process of adding samples of BPSK signals at the same data transfer rate.

Keywords: method, sampling, readings, digital addition of signals, very long baseline interferometer, intermediate carrier frequency, complex down-conversion

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