189.Title: Interferometric switch based all optical scheme for conversion of binary number to its quaternary-signed digit form

Author: Chattopadhyay, T; Das, MK; Roy, JN; Chakraborty, AK; Gayen, DK

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Abstract: Multi-valued logic (with radix. 2) can be viewed as an alternative approach to solve many problems in transmission, storage and processing of large amount of information in digital signal processing. In arithmetical operation signed digit number is very essential for carry free computation. To achieve the parallelism in computation, a suitable number system and an efficient encoding/decoding scheme for handling the data are very much essential. In radix-4 system negative number is represented by quaternary-signed digit (QSD). In this study a conversion from 3-bit binary number (2's complement representation) to its equivalent single-digit QSD is reported. The technique for conversion of QSD to its binary equivalent form is also presented. All-optical circuits are designed with non-linear material-based interferometric switches such as terahertz optical asymmetric demultiplexer in optical tree architecture, where the numbers are represented by different discrete polarised state of light. Device-based simulation of the proposed optical circuit is used to verify the operation of the optical converter.