

**Deza, M.-M.; Rosenberg, I. G.**

**General convolutions motivated by designs.** (English) Zbl 0612.05017  
*Acta Univ. Carol., Math. Phys.* 27, No. 2, 49-66 (1986).

Let  $V$  be a finite set and let  $P(V)$  denote the power set of  $V$ ; let  $X + Y$  denote the Boolean sum of the subsets  $X, Y \subseteq V$ . We consider the collection of all functions from  $P(V)$  into the integers. Note that certain of these functions represent, in a natural way, the  $t$ -designs on  $V$ . A useful tool in studying  $t$ -designs and their generalizations is the convolution:

$$(f * g)(Z) = \sum_{X+Y=Z} f(X)g(Y).$$

In this paper, the authors study the properties of the convolution in a very general setting: The set  $V$  is no longer required to be finite; the power set is replaced by an ideal in  $(P(V), \subseteq)$ ; Boolean "+" sum is replaced by a far more general operation "o" closed on the ideal; and the integers are replaced by an associative, commutative ring with identity or even a more general structure.

Reviewer: [J.E.Graver](#)

**MSC:**

[05B30](#) Other designs, configurations

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[t-designs](#); [convolution](#)

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