

Varieties of binary modes

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A *binary mode* or *groupoid mode* is a set with a binary operation that is idempotent and entropic. An identity is *regular* if the same sets of variables appear on each side. A variety is *irregular* if it is specified by at least one irregular identity. The *regularization* of a variety is the class of models of the regular identities satisfied by each member of the variety.

We describe a lower part of the lattice of varieties of binary modes. The lower part of the lattice splits naturally into two subparts. One consists of irregular varieties. The other consists of their regularizations. The regularized varieties are easily described. The irregular varieties split further into two parts. One consists of idempotent and entropic quasigroups. The other consists of varieties of so-called *reductive groupoid modes* (including for example the variety of differential groupoids).