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Abstract: Peirce algebras combine sets, relations and various operations linking the two in a unifying setting. This paper offers a modal perspective on Peirce algebras. Using modal logic a characterization of the full Peirce algebras is given, as well as a finite axiomatization of their equational theory that uses so-called unorthodox derivation rules. In addition, the expressive power of Peirce algebras is analyzed through their connection with first-order logic, and the fragment of first-order logic corresponding to Peirce algebras is described in terms of bisimulations.

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