Scientiae Mathematicae Japonicae

JI-DISTRIBUTIVE, DUALLY QUASI-DE MORGAN SEMI-HEYTING AND HEYTING ALGEBRAS

HANAMANTAGOUDA P. SANKAPPANAVAR

Received October 20, 2017

Dedicated to Professor P.N. Shivakumar
A Great Humanitarian who changed the course of my life

Abstract. The variety **DQD** of dually quasi-De Morgan semi-Heyting algebras and several of its subvarieties were investigated in the series [26] - [31]. In this paper we define and investigate a new subvariety **JID** of **DQD**, called "JI-distributive, dually quasi-De Morgan semi-Heyting algebras", defined by the identity: $x' \vee (y \to z) \approx (x' \vee y) \to (x' \vee z)$, as well as the (closely related) variety **DSt** of dually Stone semi-Heyting algebras. Firstly, we prove that **DSt** and **JID** are discriminator varieties of level 1 and level 2 respectively. Secondly, we give a characterization of subdirectly irreducible algebras of the subvariety $\mathbf{JID_1}$ of **JID** of level 1. As applications, we derive that the variety $\mathbf{JID_1}$ is the join of the variety **DSt** and the variety of De Morgan Boolean semi-Heyting algebras, give a concrete description of the subdirectly irreducible algebras in the subvariety $\mathbf{JIDL_1}$ of $\mathbf{JID_1}$ defined by the linear identity: $(x \to y) \vee (y \to x) \approx 1$, and deduce that the variety $\mathbf{JIDL_1}$ is the join of the variety **DStHC** generated by the dually Stone Heyting chains and the variety generated by the 4-element De Morgan Boolean Heyting algebra. Furthermore, we present an explicit description of the lattice of subvarieties of $\mathbf{JIDL_1}$ and equational bases for all subvarieties of $\mathbf{JIDL_1}$. Finally, we prove that the amalgamation property holds for all subvarieties of **DStHC**.

Key words and phrases. JI-distributive, dually quasi-De Morgan semi-Heyting algebra, De Morgan semi-Heyting algebra, De Morgan Heyting algebra, dually Stone semi-Heyting algebra, dually Stone Heyting algebra, discriminator variety, simple algebra, subdirectly irreducible algebra, equational base.