

HYPERIDENTITIES IN $(X(Y Z))Z$ WITH REVERSE ARC GRAPH VARIETIES OF TYPE $(2, 0)$

AMPORN ANANTPINITWATNA AND TIANG POOMSA-ARD

Abstract

Graph algebras establish a connection between directed graphs without multiple edges and special universal algebras of type $(2,0)$. We say that a graph G satisfies a term equation $s \approx t$ if the corresponding graph algebra $A(G)$ satisfies $s \approx t$. A class of graph algebras V is called a graph variety if $V = \overline{Mod}_g \Sigma$ where Σ is a subset of $T(X) \times T(X)$. A graph variety $V' = Mod_g \Sigma'$ is called $(x(yz))z$ with reverse arc graph variety if Σ' is a set of $(x(yz))z$ with reverse arc term equation. A term equation $s \approx t$ is called an identity in a variety V if $A(G)$ satisfies $s \approx t$ for all $G \in V$. An identity $s \approx t$ of a variety V is called a hyperidentity of a graph algebra $A(G)$, $G \in V$ whenever the operation symbols occurring in s and t are replaced by any term operations of $A(G)$ of the appropriate arity, the resulting identities hold in $A(G)$. An identity $s \approx t$ of a variety V is called a hyperidentity of V if it is a hyperidentity of $A(G)$ for all $G \in V$.

In this paper we characterize all hyperidentities of each $(x(yz))z$ with reverse arc graph variety. For identities, varieties and other basic concepts of universal algebra see e.g. [4].

Key Words: Varieties, $(x(yz))z$ with reverse arc graph varieties, Term, Identities, Hyperidentities, Binary algebra, Graph algebra.

2000 Mathematics Subject Classification : 05C25, 08B15