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1003-05-990 **Akemi Kashiwada*** (akashiwada@hmc.edu), Department of Mathematics, Harvey Mudd College, 1250 N. Dartmouth Ave., Claremont, CA 91711, **Claus-Jochen Haake**, Institute of Mathematical Economics, University of Bielefeld, P.O.Box 10 01 31, D-33501 Bielefeld, Germany, and **Francis Edward Su** (su@math.hmc.edu), Department of Mathematics, Harvey Mudd College, 1250 N. Dartmouth Ave., Claremont, CA 91711. *The Shapley Value of Phylogenetic Trees.*

Phylogenetic trees represent theoretical evolutionary relationships among various species. Mathematically they can be described as weighted binary trees and the leaves represent the taxa being compared and the weight of edge is some notion of distance between its endpoints. If we think of phylogenetic trees as cooperative games where the worth of a coalition is the weight of the subtree spanned by its members, then we can use the Shapley value, an important game theoretic concept, to solve this game. We prove that the Shapley value of tree games is characterized by five axioms, and discuss what these mean in a biological context. We also show how the Shapley value depends on the edge weights of the tree, and prove that the Shapley value of a n -leaf tree game can be reconstructed from the Shapley value of its $(n-1)$ -leaf subtrees. (Received October 05, 2004)