

Meeting: 999, Nashville, Tennessee, SS 13A, Special Session on Semigroup Theory

999-08-119 **Robert B. McFadden*** (mcfadden@louisville.edu), Department of Mathematics, University of Louisville, Louisville, KY 40292. *Residuation on the bicyclic semigroup.*

A partially ordered semigroup S is *right residuated* if $(\forall g, h \in S)$ there exists a maximum element $x \in S$ such that $gx \leq h$. In this case x is denoted by $h \cdot g$ and called the *right residual* of h by g . A *residuated semigroup* is one which is both right and left residuated. For example, the bicyclic semigroup B is a residuated semigroup under its natural partial ordering. There are exactly four distinct compatible total orderings on B and these are the only compatible orderings under which B is a lattice ordered semigroup. The purpose of this paper is to determine those compatible total orderings on B under which B is residuated. We also consider the existence of residuals in partially ordered inverse semigroups. We show how residuals or dual-residuals can be used to define equivalence relations on a residuated semigroup, relations that have a close connection with the traditional Green's relations on any semigroup. (Received August 17, 2004)