

New Predicates

The following are three new predicates that I wrote. They are in the same form of the previous ones but with different functionality.

DiffOneP(A,B): This predicate will be true if the two numbers are different by one. In other words if A is one less than B or B is one less than A. If this predicate is used, then to compute the hexecutability subtract 0.03.

zeroP(A,B,C,D): This predicate will be true if the four numbers by using the four basic arithmetic operators equal zero. If this predicate is used, then to compute the hexecutability subtract 0.2.

sametP(A,B,C): This predicate will be true if three of the numbers are the same. If this predicate is used, then to compute the hexecutability subtract 0.04.

New Functions

OpHex: This function augments the previous hex function and adds different weights to the basic four arithmetic operators. The weights are between “0” and “1”, the closer to zero the number is, the harder it is for a human to compute and the closer to “1” the easiest for a human to compute.

Parameter: This function ranks the predicates in a way that the less numbers a predicate takes the easiest it is to compute and the more parameters it takes the hardest it is to compute. Scores are assigned from 0 to 1. In this function “0” is assigned to predicates taking six parameters and “1” to predicates taking one parameter.

Predicate: This function will look at the number of predicates a given heuristic has. The more predicates a heuristic has, the more time consuming it is to apply. Some scores will be assigned

from 0 to 1. If a score of 1 is assign that means that the heuristic has only one predicate, and if a score of 0 is assign that means that the heuristic has many predicates which makes it very time consuming to apply it.

The New Heuristics

H10. If $\text{DiffOneP}(A,B) \wedge \text{OneP}(G) \wedge \text{zeroP}(C,D,E)$ then $(A-B + (\text{zeroP}(C,D,E)))$

Numbers = {3,4,5,2,7} Goal = 1...Solution = $(3-1) + ((5 + 2) - 7)$

Numbers = {3,3,6,8,9} Goal = 1...Solution = $(9-8) + ((3 + 3) - 6)$

Numbers = {8,4,2,2,1} Goal = 1...Solution = $(2-1) + ((8 / 4) - 2)$

Hexecutability = $1 - 0.03 - 0.04 - 0.03 = .9$

Applicability = $3/100$

H11: if $\text{zeroP}(A,B,C,D) \wedge \text{goalP}(E)$ then $(E + (\text{zeroP}(A,B,C,D)))$

Numbers = {3,3,2,2,7} Goal = 7...Solution = $(7 + ((3 - 3) + (2-2)))$

Numbers = {6,9,2,0,3} Goal = 9...Solution = $(9 + (((6 / 2) * 2) * 0))$

Numbers = {7,7,4,8,7} Goal = 4...Solution = $(4 + ((7 - 7) * (8-7)))$

Hexecutability = $1 - 0.2 - 0.04 = .76$

Applicability = $7/100$

H12: if $\text{sameP}(A,B) \wedge \text{sametP}(C,D,E)$ then $((A/B) * ((C/D) * E))$

Numbers = {3,3,8,8,8} Goal = 8...Solution = $((3/3) * ((8/8) * 8))$

Numbers = {5,4,4,5,4} Goal = 4...Solution = $((4/4) * ((5/5) * 4))$

Numbers = {7,9,9,9,7} Goal = 9...Solution = $((7/7) * ((9/9) * 9))$

Hexecutability = $1 - 0.08 - 0.04 = .88$

Applicability = $0/100$