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CSI 3350

Homework Question 2:

1. (0,1) ∈ S

Given the base case of (0,1) ∈ S, we know the set is talking in respect to n ∈ N (0 is the start of the natural numbers). Based on the Rule of Inference, we know that the second pair is going to be multiplying some natural number (n) by seven and adding one to it because the base case of that natural number is one. The first pair will remain n (natural number) because n \* 1 = n.

Thus the rules are defining the set of: { (n, 7n+1) | n ∈ N }

1. (0,1) ∈ S

Given the base case of (0,1) ∈ S, we know the set is talking in respect to n ∈ N (0 is the start of the natural numbers). Based on previous homework problem, the definition for = = and the conclusion for the Rule of Reference was (n, m+2n+1). It is safe to assume that the second pair will have some power. The ‘k’ in this conclusion doesn’t have any other variables or constants so it cannot fit the definition of but is a potential fit. Evaluating (0,1), we get the set ( (4,16). ((3,8) . ((2, 4) . ( (1,2) . (0 ,1) )))). Where it fits the equation of where n ∈ N (= (2), =(4), =(8), =16, …). Thus, the rules are defining the set of: { (n, ) | n ∈ N }

1. (0,0,1) ∈ S

Given the base case of (0,0,1) ∈ S, we know the set is talking in respect to n ∈ N (0 is the start of the natural numbers). Evaluating some results gives us a set of:

((6,8,13).((5,5,8).((4,3,5).((3,2,3).((2,1,2).((1,1,1).(0,0,1)))))))

Splitting by values gives us:

n: 1,2,3,4,5,6

i: 1,1,2,3,5,8

j: 1,2,3,5,8,13

n is just an element of the natural numbers.  
i is the Fibonacci series (n + (previous value) ))

j is the Fibonacci series if we include the given set

Thus, these rules define: {(n, Fibonacci(n), Fibonacci(n+1)) | n ∈ N.

1. (0,1,0) ∈ S

Given the base case of (0,1,0) ∈ S, we know the set is talking in respect to n ∈ N (0 is the start of the natural numbers). Evaluating some results gives us a set of:

((3,7,9).((2,5,4).((1,3,1).(0,1,0))))

n: 0,1,2,3

i: 1,3,5,7

j: 0,1,4,9

n is just an element of the natural numbers.  
i fits the form 2n+1

j fits the form of

Thus, these rules define: {(n, 2n+1, ) | n ∈ N.