The Fibonacci Sequence

The Fibonacci sequence consists of $\{0, 1, 1, 2, 3, 5, 8, 13,...\}$. After looking at this sequence for a moment one can easily see that beginning with the third element, each element is the sum of the two preceding elements. This can be notated by,

$$Y_{k+2} = Y_{k+1} + Y_k \text{ where } k = 0, 1, 2, \ldots$$

Y_{k+2} depends on the function F, where $F(k, Y_{k+1}, Y_k) = Y_{k+1} + Y_k$ which depends on k.

$$Y_{k+2} = F(k, Y_{k+2-1}, Y_{k+2-2}) = F(k, Y_{k+1}, Y_k).$$

Therefore, $Y_{k+2} = Y_{k+1} + Y_k$ forms the rule for the sequence.