$$F(x) = x + x^{p+2} + x^{2p+3} + x^{3p+4} + \cdots = x/(1 - x^{p+1})$$

in Theorem 1.1 gives

$$\sum_{n=0}^{\infty} C_n x^n = \frac{1}{1 - \dfrac{x}{1 - x^{p+1}}} = \frac{1 - x^{p+1}}{1 - x - x^{p+1}} \tag{4.4}$$

so that

$$C_n = u(n;p,1) - u(n-p-1;p,1).$$

Again, $p = 1$ yields Fibonacci numbers, being the case of the sequence of odd integers, where $C_n = F_n$, as in (2.6).

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A NOTE ON TOPOLOGIES ON FINITE SETS

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In an article [1] by D. Stephen, it was shown that an upper bound for the number of elements in a non-discrete topology on a finite set with n elements is $3(2^{n-2})$ and moreover, that this upper bound is attainable. The following example and theorem furnish a much easier proof of these results.

Example. Let b, c be distinct elements of a finite set X with $n (n \geqslant 2)$ elements. Define

$$\Gamma = \{ A \subset X \mid b \in A \text{ or } c \notin A \}.$$

Now Γ is a topology on X and since there are 2^{n-1} subsets of X containing b and 2^{n-2} subsets of X which do not intersect $\{ b, c \}$ we have

$$2^{n-1} + 2^{n-2} = 3(2^{n-2})$$

elements in Γ.

Theorem. If Σ is a non-discrete topology on a finite set X, then Σ is contained in a topology of the type defined in the example.

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