7. We remark that the difference equation (1.1) can be generalized in an obvious way. Let α, β be roots of the quadratic equation

$$x^2 - px + q = 0, \tag{7.1}$$

where p, q are arbitrary numbers, and put

$$f(x, y) = (1 - \alpha x - \beta y)(1 - \beta x - \alpha y) = 1 - p(x+q) + qx^2 + (p^2 - 2q)xy + qy^2 .$$

Then the generalized equation is

$$u_{m,n} - pu_{m-1,n} - pu_{m,n-1} + qu_{m-2,n} + (p^2 - 2q)u_{m-1,n-1} + qu_{m,n-2} = 0 . \tag{7.2}$$

The results obtained above for (1.1) can be carried over without difficulty to the more general equation (7.2).

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Continued from page 176.

Equating coefficients in (1) and (3), one obtains, the Binet form

$$F_n = \frac{\alpha^n - \beta^n}{\alpha - \beta} .$$

If, on the other hand we let $y = 2$, $y' = 1$; $x = 0$, equation (1) becomes

$$y = e^{\alpha x} + e^{\beta x} = \sum_{n=0}^{\infty} (\alpha^n + \beta^n) \frac{x^n}{n!} .$$

The series solution yields $u_0 = 2$ and $u_1 = 1$ so that equation (3) becomes

$$y = \sum_{n=0}^{\infty} \frac{L_n x^n}{n!} ,$$

and one obtains

$$L_n = \alpha^n + \beta^n .$$

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