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

Substituting this in (1) we get

$$I = L_kF_k^2F_{3n} + (-1)^kF_n^3L_k$$

Therefore,

$$F_{n+k}^3 + (-1)^kF_{n-k}^3 = L_k\left[F_k^2F_{3n} + (-1)^kF_n^3\right]$$

Also solved by Charles R. Wall.

LATE ACKNOWLEDGEMENTS

Clyde Bridger: H-79, H-80.

C. B. A. Peck: H-32, H-44, H-45, H-67.

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(Continued from p. 138.)

All known Fibonacci equations using F_n are theoretically generalizable to equations using F_x. For some examples, see [2]. See [3] also.

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