$$s^n(\alpha^n+\beta^n) = s^nL_n = \sum_{i=0}^{n}\binom{n}{i}(-1)^iL_{ri} = \sum_{i=0}^{n}\binom{n}{i}(-1)^i(\alpha^r)^i$$

$$+\sum_{i=0}^{n}\binom{n}{i}(-1)^i(\beta^r)^i = (1-\alpha^r)^n+(1-\beta^r)^n$$

from which it is readily verified that $r = 0, 1, 2, 3$ and $5 = 0, 1, -1, -2$, respectively, are solutions.

*Also solved by Herta T. Freitag, Ralph Garfield, and the Proposer.*

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**[Continued from page 92.]**

## ADVANCED PROBLEMS AND SOLUTIONS

$$\begin{cases} \alpha^2A(n)+\alpha B(n) = 0 \\ (\alpha-\beta)C(n) = 0 \\ A(n)+\alpha B(n) = 0 \end{cases}$$

It follows at once that

$$A(n) = B(n) = C(n) = 0 \qquad (n \geqslant 0).$$

It is evident that a similar result holds for the Lucas numbers and similar sequences of numbers.

*Also solved by P. Tracy and P. Bruckman.*

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