Method XI. For yet another method see A. G. Shannon's solution in the April 1976 Advanced Problem Section solution to H-237.

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Then the sequence

$$(w_n) = (\log H_n H_n^*)$$

is u.d. mod 1.

Proof. We have

$$w_{n+1} - w_n = \log \frac{H_{n+1}}{H_n} + \log \frac{H_{n+1}^*}{H_n^*} ,$$

which tends to

$$2 \log \frac{1+\sqrt{5}}{2}$$

as $n \to \infty$ for

$$\frac{H_{n+1}}{H_n} = \frac{qF_n + pF_{n-1}}{qF_{n-1} + pF_{n-2}} = \frac{q(F_n/F_{n-1}) + p}{q(F_{n-1}/F_{n-2}) + p} \cdot \frac{F_{n-1}}{F_{n-2}}$$

goes to

$$\frac{1+\sqrt{5}}{2}$$

as $n \to \infty$

Theorem 3. Let p, q, p^*, q^*, H_n and H_n^* have the same meaning as in Theorem 2. Then the sequence

$$(x_n) = (\log (H_n + H_n^*))$$

is u.d. mod 1.

Proof. By the definitions of H_n and H_n^* we have

$$H_n + H_n^* = (q+q^*)F_{n-1} + (p+p^*)F_{n-2} \quad (n \geqslant 3)$$

and so we see that

$$x_{n+1} - x_n = \log ((H_{n+1} + H_{n+1}^*)/(H_n + H_n^*)) = \log \frac{(q+q^*)F_n + (p+p^*)F_{n-1}}{(q+q^*)F_{n-1} + (p+p^*)F_{n-2}} ,$$

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