**ZMATH 2016d.00781**

**Schmuland, Byron**

**Linear recurrences via probability.**

Am. Math. Mon. 122, No. 4, 386-389 (2015).

*D. Borwein* et al. [Am. Math. Mon. 121, No. 6, 486–498 (2014; Zbl 1303.39002)] have presented various approaches to studying the convergence of the recurrently defined sequence

$$x_n = \alpha_m x_{n-1} + \alpha_{m-1} x_{n-2} + \cdots + \alpha_1 x_{n-m}, \quad n > m, \tag{1}$$

with initial conditions $x_n = a_n$, $n = 1, \ldots, m$. The author of the paper under review offers two more approaches based on probability theory provided the $\alpha_j$ are positive. Namely, Markov chain techniques allow one to represent the limit $L$ of $(x_n)$ as $L = \sum_{k=1}^{m} \alpha_k \pi_k$, with $\pi$ the stationary distribution of the chain that is canonically associated to (1). Another approach makes use of renewal theory. I completely agree with the author's conclusion that "this delightful problem could also enliven an intermediate probability class." *Dirk Werner (Berlin)*

*Classification:* I75 K65
*Keywords:* linear mean recurrences; convergence; Markov chain; renewal theorem
doi:10.4169/amer.math.monthly.122.04.386