

# On Poincaré–Perron theorems for systems of linear difference equations

SIGRUN BODINE<sup>1</sup>, D.A. LUTZ<sup>2</sup>

<sup>1</sup> *Department of Mathematics and Computer Science, University of Puget Sound, Tacoma, WA 98416, USA.*

*E-mail address:* sbodine@pugetsound.edu

<sup>2</sup> *Department of Mathematics and Statistics, San Diego State University, San Diego, CA 92182, USA.*

*E-mail address:* lutz@saturn.sdsu.edu

The classical theorems of Poincaré and Perron are concerned with the asymptotic behavior of solutions of scalar  $k$ th order linear difference equations

$$y(n+k) + [c_1 + p_1(n)]y(n+k-1) + \cdots + [c_k + p_k(n)]y(n) = 0,$$

with  $p_i(n) \rightarrow 0$  as  $n \rightarrow \infty$ ,  $1 \leq i \leq k$ .

More recently, generalizations to the asymptotic behavior of solutions of systems of first order difference equations

$$\vec{y}(n+1) = [A + P(n)]\vec{y}(n), \quad P(n) \rightarrow 0 \quad \text{as } n \rightarrow \infty,$$

have attracted significant interest. Contributions include works by Máté and Nevai, Trench, Pituk, and M. Pinto.

In our talk, we will briefly review some of the established results in this field before presenting further generalizations derived in our work.