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THE ALDER-WAINWRIGHT EFFECT FOR STATIONARY PROCESSES WITH REFLECTION POSITIVITY (II)

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1. Introduction

This paper studies two kinds of linear random difference equations

$$\Delta X(n) = -\beta_1\left(\frac{X(n)+X(n-1)}{2}\right) - \underset{\varepsilon\downarrow 0}{\text{l.i.m.}}\,(\gamma_{1,\varepsilon}*\Delta X)(n)+\alpha_1\xi(n) \quad \text{a.s. } (n\in\boldsymbol{Z}), \tag{1.1}$$

$$\Delta X(n) = -\beta_2\left(\frac{X(n)+X(n-1)}{2}\right) - \underset{\varepsilon\downarrow 0}{\text{l.i.m.}}\,(\gamma_{2,\varepsilon}*\Delta X)(n)+\alpha_2 I(n) \quad \text{a.s. } (n\in\boldsymbol{Z}) \tag{1.2}$$

with infinite delays. Here

$$\Delta X(n) = X(n)-X(n-1) \quad (n\in\boldsymbol{Z}), \tag{1.3}$$

α_j and $\beta_j (j=1, 2)$ are positive constants and, for $j=1, 2$ and $\varepsilon>0$, $\gamma_{j,\varepsilon}$ is defined by

$$\gamma_{j,\varepsilon}(n) = \chi_{[1,\infty)}(n)\int_{-1+\varepsilon}^{1-\varepsilon} t^{n-1}\,\rho_j(dt) \quad (n\in\boldsymbol{Z}) \tag{1.4}$$

with a bounded Borel measure ρ_j on $[-1, 1]$ such that

$$\rho_j(\{-1, 1\}) = 0, \int_{-1}^{1}\frac{1}{\lambda+1}\,\rho_j(d\lambda)<1\,. \tag{1.5}$$

$\boldsymbol{\Xi}=(\xi(n); n\in\boldsymbol{Z})$ in (1.1) is a normalized Gaussian white noise or a sequence of independent Gaussian random variables with mean 0 and variance 1. $\boldsymbol{I}=(I(n); n\in\boldsymbol{Z})$ in (1.2) is a real stationary Gaussian process named the *Kubo noise* associated with the solution $\boldsymbol{X}=(X(n); n\in\boldsymbol{Z})$ of (1.2). The Kubo noise $\boldsymbol{I}$ is related to $\boldsymbol{X}$ through the following relation

$$X(n) = \frac{1}{\sqrt{2\pi}}\sum_{m=-\infty}^{n} R_2(n-m)\,I(m) \quad \text{a.s.} \quad (n\in\boldsymbol{Z}) \tag{1.6}$$

(Theorem 4.1 in [11]), where R_2 is the correlation function of $\boldsymbol{X}$. For the