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On a Full Spectrum Condition for 2-Dimensional Linear Quasi-Periodic Systems

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§1. In this paper, we consider the problem concerning linear quasi-periodic systems. Before starting our discussions, we state the following definitions.

DEFINITION 1 ([2, 3]). A real number λ is called a characteristic exponent of the system

$$\dot{x}=C(t)x\ , \qquad t\in \boldsymbol{R}\ , \quad \dot{}=\frac{d}{dt}\ , \tag{1.1}$$

if there exists a solution $x(t)$ of (1.1) which satisfies

$$\limsup_{t\to\infty} t^{-1}\log|x(t)|=\lambda\ .$$

DEFINITION 2 ([4]). If the number of characteristic exponents of (1.1) is equal to the dimension of (1.1), then we say that (1.1) has full spectrum.

Now, let there be given a linear almost periodic system

$$\dot{x}=C(t)x\ , \qquad x\in \boldsymbol{R}^n\ . \tag{1.2}$$

If (1.2) has full spectrum, then it is shown in [1] that (1.2) has a fundamental matrix $X(t)$ of the form

$$X(t)=F(t)\,\mathrm{diag}\Big(\exp\Big(\int_0^t d_1(s)ds\Big),\ \cdots,\ \exp\Big(\int_0^t d_n(s)ds\Big)\Big)$$

where $F(t)$ is an almost periodic matrix function and $d_i(t)$ $(i=1,\cdots,n)$ are almost periodic functions. Also it is shown in [4] that, if (1.2) is especially a linear quasi-periodic system whose coefficient matrix satisfies a nonresonance condition and a smoothness condition and if (1.2) has

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