**Buslaev, V.**; **Fedotov, A.**
**On the difference equations with periodic coefficients.** (English) Zbl 1012.39008
Adv. Theor. Math. Phys. 5, No. 6, 1105-1168 (2001).

Summary: We study entire solutions of the difference equation

$$\psi(z+h) = M(z)\psi(z),\ z \in \mathbb{C},\ \psi(z) \in \mathbb{C}^2.$$

In this equation, $h$ is a fixed positive parameter, and $M : \mathbb{C} \mapsto SL(2,\mathbb{C})$ is a given matrix function. We assume that $M(z)$ is a $2\pi$-periodic trigonometric polynomial. The main aim is to construct the minimal entire solutions, i.e. the solutions with the minimal possible growth simultaneously as for $z \to -i\infty$ so for $z \to +i\infty$.

We show that the monodromy matrices corresponding to the bases made of the minimal solutions are trigonometric polynomials of the same order as the matrix $M$. This property relates the spectral analysis of the one-dimensional difference Schrödinger equations with the potentials being trigonometric polynomials to an analysis of a finite dimensional dynamical system.

**MSC:**

| | | |
|---|---|---|
| 39A11 | Stability of difference equations (MSC2000) | Cited in **13** Documents |
| 39A12 | Discrete version of topics in analysis | |
| 37J45 | Periodic, homoclinic and heteroclinic orbits; variational methods, degree-theoretic methods (MSC2010) | |

**Keywords:**

asymptotics; difference equations; periodic coefficients; minimal entire solutions; Schrödinger equations; finite dimensional dynamical system

**Full Text:** DOI