

(Corrected) homework assignment
Dynamical Systems II
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<http://dynamics.mi.fu-berlin.de/lectures/>
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Problem 1: [FLOQUET theory for discrete dynamical systems] Consider the iteration

$$x_{k+1} = A_k x_k, \quad k \in \mathbb{N}_0,$$

with $A_{k+p} = A_k$ for all $k \in \mathbb{N}_0$, and some fixed period $p \in \mathbb{N}$, $p \geq 1$. Assume all (complex) matrices A_k to be invertible.

Prove: there exist (complex) matrices B, C_k , $k \in \mathbb{N}_0$, with $C_{k+p} = C_k$ for all $k \in \mathbb{N}_0$, and

$$\prod_{k=0}^{m-1} A_k = A_{m-1} \cdots A_0 = C_m B^m \quad \text{for all } m \in \mathbb{N}_0.$$

(The empty product is defined to be the identity.)

Compare with the Floquet theorem for flows and discuss.