

# Separation of variables and explicit theta-function solution of the classical Steklov--Lyapunov systems: A geometric and algebraic geometric background

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The paper revises the explicit integration of the classical Steklov--Lyapunov systems via separation of variables, which was first made by F. K\"otter in 1900, but was not well understood until recently. We give a geometric interpretation of the separating variables and then, applying the Weierstrass hyperelliptic root functions, obtain explicit theta-function solution to the problem. We also analyze the structure of its poles on the corresponding Abelian variety. This enables us to obtain a solution for an alternative set of phase variables of the systems that has a specific compact form.

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