

数学与系统科学研究院

计算数学所学术报告

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报告题目:

**Hamiltonian and preHamiltonian  
and Nijenhuis operators**

邀请人: 胡星标 研究员

报告时间: **2019 年 11 月 5 日 (周二)**

**下午 14:00-15:00**

报告地点: **数学院南楼二层**

**202 教室**

## **Abstract:**

We introduce preHamiltonian pairs of difference operators and study their connections with Nijenhuis and Hamiltonian operators.

A difference operator is called preHamiltonian if its image is a Lie subalgebra with respect to the Lie bracket of evolutionary vector fields on a difference field. Two preHamiltonian operators form a preHamiltonian pair if any their linear combination is preHamiltonian. Then we show that preHamiltonian pairs naturally lead to Nijenhuis operators. Moreover, Nijenhuis operators can be represented in terms of a preHamiltonian pair. This provides a systematic method to check whether a rational operator is Nijenhuis.

We explore the link between preHamiltonian and Hamiltonian operators and show that if  $H$  is a rational Hamiltonian operator, then to find a second Hamiltonian operator  $K$  compatible with  $H$  is the same as to find a preHamiltonian pair  $A$  and  $B$  such that  $K=AB^{-1}H$  is skew-symmetric.

In the end, we illustrate our theory on known and new examples.

This is the joint work with S. Carpentier and A.V. Mikhailov.

**欢迎大家参加！**