清华大学高等研究院

科学与创新系列报告

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1. Kuramoto model of syncing **报告人：高苹**

摘要：每当夏日来临，我们便会经常看到成群的萤火虫在天空中一起闪烁着美丽的荧光，但是我们是否想过这么多萤火虫为什么会这么整齐地闪烁？几个同伴一起走在大街上,如果你足够细心，你可能会注意到相互之间的步伐可能会渐渐整齐，你是否想过有什么简单模型来解释这一现象？心脏的跳动时,成千上万的瓣膜细胞总是按照同样的周期的和相位作周期运动来完成一次次的瓣膜开关动作,你是否想过为什么它们会有如此同步的细胞震荡？一个精彩的节目落幕，掌声雷动，我们是否发现掌声常常很快从凌乱趋向于一致？生活中我们常常会遇到这样那样的巧合，这些巧合很多呈现出“同步”这样的特征。为了研究这些现象，一门名为共时学的学科正在兴起。在本次报告中，我将介绍共时理论中最经典的模型Kuramoto model。通过这一简单的非线性模型，我们可以初步解释为什么会有这样常见而又神奇的共时现象。

2. Galois Theory **报告人：李星河**

摘要：The solution of linear and quadratic equations are well-known by all ancient civilizations. However the methods for solving cubic and quartic equations were not discovered until the Renaissance. French mathematician Vieta and Lagrange made pioneering contributions to theories of algebraic equations. Nearly all prestigious mathematicians at that time had ever tried to solve quintic equations but all of them just failed. In the early 1800s', Norwegian mathematician N.Abel and Italian mathematician Ruffini proved that a general quintic equations can not be solved by radicals. However, they did not give a real quintic equations that cannot be solved by radicals. During the 1820s', a young French mathematician Evariste Galois successfully and completely solved similar problems and built up the foundations of modern algebra.

In this talk, I'll give a brief introduction on how to solve cubic and quartic equations and the relation of algebraic equations and permutation groups. Next, I'll give an introduction to Galois theory and prove the insolvability of quintic equations using Galois theory.