



浙江大学信电系与数学系

联合学术报告会 (9月5~6日)



数学与工程的对话

<p>2011年9月5日 3:30pm-4:30pm</p>	<p>玉泉校区 教三</p>	<p>Computing by symmetry The popular 2008 movie "21" was based on the story of the <i>MIT Blackjack Team</i>, which won \$M's in Las Vegas, Atlantic City, the Bahamas, St. Martin, Aruba, Puerto Rico, Europe, ... in the early 1990s. The Team was formed after I left MIT. Before their magnificent tour, the Team managed to track me down on the opposite side of the earth and tried to invite me to join. This was before the age of Internet. Why me?</p> <p>I had a private theory for exponential speed-up in the computation of blackjack probabilities. It applied some algebra of the symmetric group to tree-search computing. I had fun using it at Las Vegas in my younger days. My advantage over the house started at the very first hand after shuffle. When I released the theory in a 1989 paper in <i>SIAM Journal of Computing</i>, blackjack was only mentioned as one of the three applications. Clever MIT people saw through the disguise by the serious paper title "<i>Dynamic programming by exchangeability</i>."</p>
<p>2011年9月6日 10:00am-11:30am</p>	<p>441</p>	<p>Unified algebraic theory of sorting, routing, multicasting, & concentration networks</p> <p>Multistage networks for sorting, routing, and concentration are commonly deployed in packet switching and parallel processing. In terms of switching, these are all unicast devices. The arithmetic of these devices can be treated as a special case of Boolean algebra over a distributive lattice. The general Boolean principle unifies and demystifies well-known properties of these switching devices. Moreover, it applies to multicasting as well as unicasting. A useful result is the generalization of the <i>Multicast Concentrator Theorem</i> with practical application in Internet routing/switching. It leads to the 2nd-generation <i>algebraic switching fabric</i>, of which the hardware multicasting nature facilitates "3-network convergence" as well as applications of network coding.</p>

演讲人: 李硕彦 (Bob Li), 香港中文大学 信息工程讲座教授

1970年毕业于国立台湾大学, 1974年美国加州大学 Berkeley 数学博士, 1974-76 年于 M.I.T. 教授应用数学。1976-79 年于伊利诺大学 Chicago 教授数学、统计学、计算机科学, 1979-89 年于贝尔通信实验室研究通信理论、交换系统。1989 年至今任香港中文大学信息工程讲座教授。目前兼任网络编码研究所所长, 以及电子科技大学、哈尔滨工程大学、西南交通大学、西安电子科技大学、国立清华大学诸校的名誉教授。同时也是中国教育部“创新引智(111)计划”北邮基地的学术大师, 并曾兼任北京大学深圳研究生院特聘教授、北京邮电大学顾问教授。



李教授至今获得32项美国专利。他是网络编码的创立者之一, 李、杨、蔡合着的 *Linear Network Coding* 获 IEEE 信息论学会 2005 年度论文奖。台湾工研院 (ITRI) 的 "Metro Switch" 计划中所用的 "Algebraic Switching Fabric" 来自他的 "Algebraic Switching Theory and Broadband Applications" 一书。他 1980 年的 *Martingale of Patterns* 论文开创了一项研究, 可应用于基因工程和其他领域。

工程的根基主要是数学。李教授长期致力于建立抽象数学与工程之间的新桥梁, 应用于无线通信、网络通信、网络安全、信息编码、生物信息学、计算机科学、优化处理、博弈等领域。李教授的个人主页 www.ie.cuhk.edu.hk/bobli 可以链接到“数学与工程的对话”演讲系列的10套讲稿, 取材自长年工作的累积。

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