LMS School Combinatorics and Operators in Quantum Information Theory (Belfast 5-9 September 2016)

Graphs and Information Theory

Lecture 1: Graphs and zero-error capacity

1. Claude E. Shannon. The zero-error capacity of a noisy channel. *IRE Transactions on Information Theory* **IT-2**(3):8-19 (1956).
2. Janos Körner and Alon Orlitsky. Zero-Error Information Theory. *IEEE Transactions on Information Theory* **44**(6):2207-2229 (1998).
3. Toby S. Cubitt, Debbie W. Leung, William Matthews and Andreas Winter. Improving zero-error classical communication with entanglement. *Physical Review Letters* **104**:230503 (2010); arXiv:0911.5300.
4. Toby S. Cubitt, Debbie W. Leung, William Matthews and Andreas Winter. Zero-error channel capacity and simulation assisted by nonlocal correlarions. *IEEE Transactions on Information Theory* **57**:8 (2011); arXiv:1003.3195.

Lecture 2: Lovász number 1 — SDP and dual

5. Laszlo Lovász. On the Shannon capacity of a graph. *IEEE Transactions on Information Theory* **25**(1):1-7 (1979).

Lecture 3: Lovász number 2 — entanglement-assisted capacity

6. Salman Beigi. Entanglement-assisted zero-error capacity is upper bounded by the Lovász theta function. *Physical Review A* **82**:010303 (2010); arXiv:1002.2488.

Lecture 4: Noncommutative graphs and generalised Lovász number

7. Runyao Duan. Super-activation of zero-error capacity of noisy quantum channels. arXiv:[quant-ph]/0906.2527 (2009).
8. Toby S. Cubitt, Jianxin Chen and Aram W. Harrow. Superactivation of the asymptotic zero-error classical capacity of a quantum channel. *IEEE Transactions on Information Theory* **57**(12):8114-8126 (2011); arXiv:0906.2547.
9. Runyao Duan, Simone Severini and Andreas Winter. Zero-Error Communication via Quantum Channels, Noncommutative Graphs, and a Quantum Lovśz Number. *IEEE Transactions on Information Theory* **59**(2):1164-1174 (2013); arXiv:1002.2514.

Lecture 5: Graph entropy and noncommutative graph entropy

10. Janos Körner. Coding of an information source having ambiguous alphabet and the entropy of graphs, *Transactions of the 6th Prague Conference on Information Theory* (1973).

11. Gbor Simonyi. Perfect graphs and graph entropy. An updated survey. *Perfect graphs* (2001).

12. Seyed Saeed Changiz Rezaei. Entropy and Graphs. *Master thesis, University of Waterloo*, Advisor: Chris Godsil (2013).

Further reading

13. Mark M. Wilde. From classical to quantum Shannon theory. arXiv:1106.1445 (2011).

14. John Watrous. Theory of quantum information. https://cs.uwaterloo.ca/∼watrous/TQI/