Quantum Computing Seminar

Symmetric Monoidal Categories (I)

By

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Abstract: We will introduce monoidal categories and symmetric monoidal categories (SMCs) as well as the string diagrams which provide graphical calculi for computations in SMCs (Primary reference: [1,Ch. 1], secondary references: [2, §3.1, §3.3], [5, Ch. XI], [3, Ch. 3], [4, Track 1]). We define dual objects and duality data in a SMC (Primary reference: [1, Ch. 3], secondary references: [2,§3.3], [4, Track 1]). We illustrate these definitions with examples drawn from categories of vector spaces, categories of finite dimensional Hilbert spaces, and several others.

References:

1. Heunen, Chris, and Jamie Vicary. Categories for Quantum Theory: an introduction. Oxford University Press, 2019.
2. Samson Abramsky and Bob Coecke. Categorical Quantum Mechanics. arXiv:0808.1023
3. Peter Selinger. A survey of graphical languages for monoidal categories. arXiv:0908.3347
4. John Baez. Quantum Gravity Seminar - Fall 2000. online notes
5. Saunders Mac Lane. Categories for the Working Mathematician. Springer GTM volume 5, 1978.

Date: Friday, February 23, 2024
Time: 14:00
Place: SA141 - Mathematics Seminar Room & ZOOM

To request the event link, please send a message to selman.ipek@bilkent.edu.tr