Abstract:

Positive matrices (also known as positive semidefinite matrices) serve as a building block for all n x n complex matrices. We define positive matrices and describe their properties, giving numerous examples along the way. This leads us into the study of positive and completely positive maps. They have had a profound impact on modern analysis, and they have a wide range of applications, including a key role in mathematical formulations of quantum mechanics. However, despite the range of their impact, completely positive maps have a very basic form, and some of their foundational results can be obtained through basic linear algebra, as we will see.

Students currently enrolled in linear algebra are highly encouraged to attend.