

İSTANBUL ANALYSIS SEMINARS

THE SCHUR-HORN THEOREM IN VON NEUMANN ALGEBRAS

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Abstract: In 2002, Richard Kadison published two delightful papers titled, “The Pythagorean theorem,” in which he showed that thinking about the Pythagoras theorem leads one into very interesting territory. The key point of his investigation is the so called Carpenter’s rule that says that if $a^2 + b^2 = c^2$, then there is a right angled triangle with sides a, b and c . In an entirely natural way, one is led from the Carpenter’s rule to asking for a characterization of diagonals of projection matrices, something that follows from the celebrated Schur-Horn theorem.

Kadison then formulated the problem of characterizing the diagonals of projections in finite von Neumann algebras, but left the problem open. In recent work with Rajarama Bhat, we solved this problem in some special cases. I will report on this work and show how this problem is connected to other problems in Hilbert spaces, especially frame theory.

Around half of the talk will be completely elementary and should be accessible to any undergraduate. The other half will require no more than a basic knowledge of functional analysis.

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