

学位論文の要旨

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学位論文題目	The Classical Numerical Range and Its Generalizations 古典数域とその一般化についての研究		
学位論文要旨	<p>In this thesis, we will concern some related problems of the classical numerical range and its generalizations.</p> <p>In Chapter 1, we consider a generalized numerical range, namely product range for a 3-by-3 normal matrix A and the index $k = 2$. Under this setting, we prove the product range is convex if the eigenvalues of A form an acute-angled triangle inscribed to the unit circle.</p> <p>In Chapter 2, we treat the relations between complex symmetric matrices and classical numerical ranges. We characterize matrices whose discrete Fourier transforms are complex symmetric. The Fourier transform defines a unitary similarities. So we found a family of matrices which have the same classical numerical range.</p> <p>In Chapter 3, the final chapter, we shall consider the boundary points of the q-numerical range for a special Toeplitz nilpotent matrix. We also provide a program to plot the q-numerical range by using "Mathematica".</p>		