Title: Matrix range characterizations of operator system properties

Abstract: Given an operator system S, one can create two sequences of new operator systems from it, denoted OMAX_k(S) and OMIN_k(S). The first is the universal operator system with the property that every k-positive map with domain S is completely positive as a map from OMAX_k(S). The second has the property that every k-positive map with range S is completely positive as a map into OMIN_k(S). A natural question is if these new operator systems in some sense "converge to S" as k tends to infinity. The answer is "not always", but convergence does characterize certain important properties of S. Finally, when S is the finite dimensional operator system spanned by an N-tuple of operators T=(T_1,...,T_n), then these convergences can be characterized in terms of geometrical properties of the joint matricial ranges of T. Of special importance is the case when (T_1,...,T_n) are the unitary generators of the universal C*-algebra of the free group on n-generators.