

## Nearly commutative matrices

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We consider pairs of complex  $n \times n$  matrices  $(A, B)$ .

For  $n > 1$ , clearly if  $A$  and  $B$  commute, then they cannot generate the full matrix algebra,  $M_n(\mathbb{C})$ . We present a number of results showing that, under several interpretations of the term "nearly commuting", we can find nearly commuting pairs  $(A, B)$  which do generate the full matrix algebra. Many of the results are based on the representation theory of finite groups, particularly that of finite  $p$ -groups and the symmetric group and finite dimensional division algebras.

We also present a number of open questions.