# On degenerations of matrix tuples

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In this talk we give a brief introduction to the degeneration problem of matrix tuples, namely given two matrix tuples $M = (M_1, ..., M_m)$ and $N = (N_1, ..., N_n)$ of $d \times d$ matrices over a field $k$, how one can decide whether $M$ is in the Zariski-closure of the $\mathrm{GL}_d(k)$-orbit of $N$, where the $\mathrm{GL}_d(k)$-action is the simultaneous conjugation. This relation defines a partial order on the space of matrix tuples, which is called the degeneration order. We investigate the connection between the so-called hom-order and give some low dimensional results.

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