1067-16-839 **Markus Schmidmeier*** (markus@math.fau.edu), 777 Glades Road, Boca Raton, FL 33431.
Invariant subspaces of nilpotent operators.

Our interest is in invariant subspaces of nilpotent linear operators, more precisely, we consider systems (V, T, U) where V is a finite dimensional vector space, $T : V \to V$ a linear operator acting nilpotently with nilpotency index bounded by some number n, and $U \subset V$ a subspace which is invariant under the action of T.

The problem of classifying systems up to isomorphy has been posed by Garrett Birkhoff in 1934 in the corresponding situation for subgroups of finite abelian groups. It is of finite type if $n \leq 5$, has tame infinite type for $n = 6$, and is considered infeasible for $n \geq 7$. An analysis of the borderline situation throws light on the class of all invariant subspaces. It turns out that with finitely many exceptions in each dimension, the indecomposable systems for $n = 6$ occur in families indexed by continuous and discrete parameters, but have a very regular structure.

Solutions to the algebraic Riccati equation

$$0 = XA + XBX + C + DX$$

occur in optimal control theory as the steady-state solutions for linear time-invariant systems. The systems of invariant subspaces mentioned above provide minimal families of solutions to the Algebraic Riccatti Equation.

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