Algebra variety properties given by identities of derived objects

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We consider varieties of associative algebras over a field or over $\mathbb{Z}$, i.e. varieties of associative rings.

With any algebra $\langle A, +, \cdot \rangle$, two semigroups and a Lie algebra are associated in a natural way. The first semigroup is just the multiplicative semigroup $\langle A, \cdot \rangle$ of the algebra. The second one is so-called *adjoint* semigroup $\langle A, \circ \rangle$, where the multiplication $\circ$ (sometimes referred to as *circle composition*) is defined by letting $a \circ b = a + b - ab$ for all $a, b \in A$. The Lie algebra is the algebra $\langle A, +, [,] \rangle$, where $[x, y] = x \cdot y - y \cdot x$.

In this talk we discuss some algebra variety properties which are given by identities of these semigroups or by identities of this Lie algebra.