

ON THE BEHAVIOUR OF THE FROBENIUS MAP IN A NONCOMMUTATIVE WORLD

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Let R be a ring with prime characteristic p . The Frobenius map on R is given by exponentiation by p . It is a standard undergraduate exercise to check that every fixed power of the Frobenius map is a homomorphism on R , provided R is known to be commutative. Commutativity, however, is not a necessary condition here. One of our main goals is to provide a precise characterization of this condition in terms of the Lie structure of R . Our solution will make use of an associative analogue of Zelmanov's celebrated theorem: every finitely generated Lie algebra satisfying an Engel identity is nilpotent. Other closely related problems will be also be discussed.