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**Louis H Rowen\*** ([rowen@math.biu.ac.il](mailto:rowen@math.biu.ac.il)), Mathematics Dept, Bar-Ilan University, 52900 Ramat Gan, Israel. *Evaluations of associative and Lie polynomials on matrices*. Preliminary report.

(Joint work with Kanel-Belov and Malev.) Kaplansky asked about the set  $S$  of possible images of a polynomial  $f$  in several noncommuting variables in the matrix algebra  $M_n(F)$  over a field  $F$ . It follows from work of Herstein that the space spanned by  $S$  must either be scalar or contain  $\mathfrak{sl}_n$ . After a review of our earlier work for  $n \leq 3$ , when  $K$  is closed under quadratic extensions, we turn to the case of a Lie polynomial with constant term 0, and coefficients in an algebraically closed field  $K$ . We describe all the possible images of  $f$  in  $M_2(K)$ . An example is given of a polynomial  $f$  whose image is the set of trace zero matrices excluding nilpotent nonzero matrices, together with an arithmetic criterion for this case. Some Lie results are provided for  $n = 3$ , together with an indication of what remains open. (Received August 11, 2015)