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*Castelnuovo–Mumford polynomials.* Preliminary report.

We study the highest-degree homogeneous parts of Grothendieck polynomials, which we call the Castelnuovo–Mumford polynomials  $\mathfrak{CM}_w$ . In particular, we give a formula for the degrees of these polynomials, determining the Castelnuovo–Mumford regularity of matrix Schubert varieties and answering a question of Jenna Rajchgot. Indeed, we compute the leading terms of all Castelnuovo–Mumford polynomials and give a complete description of when two Castelnuovo–Mumford polynomials agree up to scalar multiple. Our formulas rely on some new facts that we establish about major index of permutations. (Received February 20, 2020)