

LINEAR SYSTEMS OF CURVES ON A SURFACE AND SECANT VARIETIES

CIRO CILIBERTO

In this talk I will report on joint work in collaboration with Francesco Russo. I will touch, as the title suggests, two different themes, i.e. linear systems and secant varieties, and I will try to indicate some new, rich and unexpected, set of relations between them. The topics treated here have deep classical roots in the work of Severi, Bronowski, Edge etc.

Concerning linear systems, I will revisit and improve on, a beautiful classical theorem of Castelnuovo and Enriques which gives an upper bound for the dimension of a linear system \mathcal{L} of curves of given genus on a surface X , and classifies those pairs (X, \mathcal{L}) for which the bound is attained. The original proof is based on the technique of *iterated tangential projections*, whereas we propose an easy, and perhaps more efficient, adjunction theoretical proof.

Regarding secant varieties, I will establish a sharp lower bound for the degree of a secant variety, and I will indicate interesting properties of varieties with *minimal secant degree*, i.e. those for which the bound is attained.

The connection between the two themes is given by the fact that surfaces with minimal secant degree are also those for which the linear system cut out on them by the hyperplanes of the ambient space is extremal with respect to the Castelnuovo–Enriques theorem. I will try to explain the reasons for which the two extremal properties are related.

I plan to talk about open problems at the end.

DIPARTIMENTO DI MATEMATICA, UNIVERSITÀ DI ROMA TOR VERGATA, VIA DELLA RICERCA SCIENTIFICA, 00133 ROMA, ITALIA

E-mail address: `cilibert@axp.mat.uniroma2.it`