The maximal number of exceptional curves going through the same point on del Pezzo surfaces of degree one

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Famous examples of del Pezzo surfaces are smooth cubic surfaces in $\mathbb{P}^3$, which are del Pezzo surfaces of degree three. Over an algebraically closed field, these contain 27 lines, of which at most three can go through the same point. Similarly, a del Pezzo surface of degree two contains 56 lines, of which at most four can go through the same point. In both of these cases, this maximum is given by the incidence graph of the lines. A del Pezzo surface of degree one contains 240 lines over an algebraically closed field, and the upper bound given by the incidence graph for the number of lines that go through the same point is 16.

However, we show that in almost all characteristics, the maximal number of lines that go through the same point is 10.

This is joint work with Ronald van Luijk.