Point-Line Minimal Problems in Complete Multi-View Visibility
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We present a complete classification of all minimal problems for generic arrangements of points and lines completely observed by calibrated perspective cameras. We show that there are only 30 minimal problems in total, no problems exist for more than 6 cameras, for more than 5 points, and for more than 6 lines. For all minimal problems discovered, we present their algebraic degrees, i.e. the number of solutions, which measure their intrinsic difficulty. Our classification shows that there are many interesting new minimal problems. Our results also show how exactly the difficulty of problems grows with the number of views. Importantly, we discovered several new minimal problems with small degrees that might be practical in image matching and 3D reconstruction.
This is joint work with Timothy Duff, Anton Leykin, and Tomas Pajdla.