

ABSTRACT. The main concrete result of this paper is enumeration of genus-two curves with complex structure fixed in  $\mathbb{P}^2$  and  $\mathbb{P}^3$ . Along the way, rational curves with certain simple singularities are counted as well. While the methods described can be used to count positive-genus curves in some other cases, the most powerful direct applications of the machinery developed are to enumeration of rational curves with a very large class of singularities in projective spaces.