

ABSTRACT. In this thesis, we study the degree of the canonical map of surfaces of general type. In particular, we give the first examples known in the literature of surfaces having degree  $d = 10, 11, 13, 14, 15$ , and  $18$  of the canonical map. They are presented in a self-contained and independent way from the rest of the thesis. We show also how we have discovered them. These surfaces are *product-quotient surfaces*. In this thesis, we study the theory of product-quotient surfaces giving also some new results and improvements. As a consequence of this, we have written and run a MAGMA script to produce a list of families of product-quotient surfaces having geometric genus three and a self-intersection of the canonical divisor large. After that, we study the canonical map of product-quotient surfaces and we apply the obtained results to the list of product-quotient surfaces just mentioned. In this way, we have discovered the examples of surfaces having degree  $d = 10, 11, 14$ , and  $18$  of the canonical map. The remaining ones with degrees  $13$  and  $15$  do not satisfy the assumptions to compute the degree of the canonical map directly. Hence we have had to compute the canonical degree of these two families of product-quotient surfaces in a very explicit way through the equations of the pair of curves defining them.

Another work of this thesis is the classification of all smooth surfaces of general type with geometric genus three which admits an action of a group  $G$  isomorphic to  $\mathbb{Z}_2^k$  and such that the quotient is a projective plane. This classification is attained through the theory of *abelian covers*. We obtained in total eleven families of surfaces. We compute the canonical map of all of them, finding in particular a family of surfaces with a canonical map of degree  $16$  not in the literature. We discuss the quotients by all subgroups of  $G$  finding several K3 surfaces with symplectic involutions. In particular, we show that six families are families of triple K3 burgers in the sense of Laterveer.

Finally, in another work we study also the possible accumulation points for the slopes  $K^2/\chi$  of unbounded sequences of minimal surfaces of general type having a degree  $d$  of the canonical map. As a new result, we construct unbounded families of minimal (product-quotient) surfaces of general type whose degree of the canonical map is  $4$  and such that the limits of the slopes  $K^2/\chi$  assume countably many different values in the closed interval  $[6 + \frac{2}{3}, 8]$ .