

# HURWITZ NUMBERS AND MONODROMY REPRESENTATIONS

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## ABSTRACT

Given Riemann surfaces  $X$  and  $Y$  where  $Y$  is compact, suppose we want to count the number of maps  $X \rightarrow Y$  which are ramified over some given points and not any others. The answer to such a question is called a Hurwitz number. Given a degree  $d$  cover of Riemann surfaces  $f : X \rightarrow Y$  with branch locus  $B$ , there is a group homomorphism that sends loops in  $Y \setminus B$  to the symmetric group  $S_d$  of  $d$  elements. This homomorphism is called a monodromy representation, and another problem of interest is to count the number of certain monodromy representations. In this expository talk, I introduce Hurwitz numbers and monodromy representations and explain a neat relation between these two counting questions, linking together multiple areas of mathematics. I will define the terms needed and have tried to make the prerequisites minimal so that this talk should be accessible to a wide audience.