

# On the number of colorings of a graph

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## **Abstract**

The chromatic polynomial  $P(G,k)$  of a graph  $G$  is the number of colorings of  $G$  with  $k$  available colors. The chromatic polynomial was introduced by Birkhoff in 1912 in order to study the 4-Color Problem. Although the chromatic polynomial has not been very successful for coloring problems, it has been studied for several other reasons, primarily by mathematicians but also by physicists. In this talk, some basic properties of the chromatic polynomial will be discussed. Special attention will be given to the case  $k=5$  for graphs on a fixed surface, and (if time permits) the case  $k=3$  for triangle-free planar graphs.