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From Representation Theory to Super-Representation Theory

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Abstract: In the 19th century, E. Galois first introduced the term 'Group' (in French, 'Groupe') while studying the symmetries of roots in polynomial equations, which led later to the concept of Representation by F. Frobenius in the late 19th century. This talk will provide an overview of representation theory up to the present day. We will explore cases where studying the representation of certain groups proves to be particularly challenging. In this context, C. André, followed by P. Diaconis and I. Isaacs, developed the theory of Super Representations (Supercharacter theory) to extend the traditional representation theory. These generalizations are valuable for studying the representation theory of groups with challenging structures. On the other hand, supercharacter theory has found applications in number theory and the study of random walks. If time permits, I will present some recent advances.

Keywords: Group Theory, Representation Theory, Supercharacter Theory, Matrix Groups.