

Exploring the characteristics of rotating electric machines with factor analysis

C. Maté Jiménez; R. Calderón

Abstract-

Applications of multivariate statistics in engineering are hard to find, apart from those in quality control. However, we think that further insight into some technological cases may be gained by using adequate multivariate analysis tools. In this paper, we propose a review of the key parameters of rotating electric machines with factor analysis. This statistical technique allows not only the reduction of the dimension of the case we are analysing, but also reveals subtle relationships between the variables under study. We show an application of this methodology by studying the interrelations between the key variables in an electric machine, in this case the squirrel-cage induction motor. Through a step-by-step presentation of the case study, we deal with some of the topics an applied researcher may face, such as the rotation of the original factors, the extraction of higher-order factors and the development of the exploratory model. As a result, we present a worthwhile framework to both confirm our previous knowledge and capture unexplored facts. Moreover, it may provide a new approach to describing and understanding the design, performance and operating characteristics of these machines.

Index Terms-

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