Effect of torsional dynamics on salient pole synchronous motor-driven compressors

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Abstract

This paper presents a rigorous treatment of the starting problem of a salient pole synchronous motor driving a complex multicompressor load. This is aimed at analysing the resulting torsional oscillations and calculating the different transmitted torques and twist angles of the multi-shaft assembly. For this purpose, the necessary mathematical models and corresponding digital simulation are developed. The results obtained show that there is a pressing need for taking care of the torsional effects on the different shafts during the design stage, otherwise serious problems could arise