

Public Abstract

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Design of a single sided linear induction motor (SLIM) using a user interactive computer program

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This project studies the design of SLIM, which can be used to power capsules in a pneumatic capsule pipeline (PCP) system. The design equations of the SLIM and the equivalent circuit model are studied and discussed in detail. A SLIM of specified parameters is designed using a user-interactive MATLAB program, and then compared to a similar tubular linear induction motor (TLIM). The SLIM equations and design procedures are developed and its performance is predicted using equivalent circuit models. End effects and edge effects are neglected in this study. The SLIM design algorithm is made completely user-interactive where the user has the convenience of choosing various design parameters like the primary voltage and frequency, number of poles, number of phases and many more.

Optimum design parameters are obtained by the iterative procedure of the design algorithm. The performance curves of the SLIM i.e., thrust and efficiency, are drawn and then analyzed for different target thrust values and rated slip. The effect of varying parameters of the SLIM such as air-gap, thickness of aluminum sheet and the number of poles on the performance of SLIM are analyzed and the results are discussed. Finally the SLIM design parameters are compared with those of a similar TLIM design of similar specifications.