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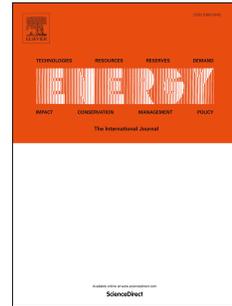
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## Optimal Vector Control To A Double-Star Induction Motor

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### 3 **Abstract**

4 The problem of energy optimization of a Double Star Induction Motor (DSIM) using the  
5 concept of a Rotor Field Oriented Control (RFOC) can be treated by an Optimal Control  
6 Strategy (OCS). Using OCS, a cost-to-go function can be minimized and subjected to the  
7 motor dynamic equations and boundary constraints in order to find rotor flux optimal  
8 trajectories. This cost-to-go function consists of a linear combination of magnetic power,  
9 copper loss, and mechanical power. The Dynamic equations are represented by using a  
10 reduced Blondel Park model of induction motor. From the Euler-Lagrange equation, a  
11 system of nonlinear differential equations is obtained, and analytical solutions of these  
12 equations are achieved so as to obtain a time-varying expression of a minimum-energy rotor

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