Abstract

Induction motors are extensively used in industrial and household appliances and consume more than 50% of the total generated electrical energy. The need for energy conservation is increasing the requirements for saving the electrical energy. It is therefore important to optimize the efficiency of electrical drive systems under light load condition. This paper proposes a control scheme based on search method taking advantage of the fact, that at a certain torque and speed (operating point) there is only one set of voltage & frequency that operates the motor at optimum efficiency. Utilizing equivalent loss model of induction motor, expressions of $V_{opt}$, $f_{opt}$ are derived mathematically. Both simulation & experiment results indicates the efficiency
Efficiency Optimization of Induction Motor Drive

Performance with VVVF is superior to that of V/F operation in steady state and light load conditions. Future work is also suggested that if in case any frequent transients come in load side, the optimization schemes can be abandoned & V/F operation should be implemented till the steady state comes.

References


Index Terms

Computer Science                Efficiency Optimization

Keywords

Induction Motor Drive   Efficiency Optimization   VVVF   V/F