

**ELECTRICAL AUTOMATION
SYSTEMS TOWARDS INTELLIGENT
AND ENERGY EFFICIENCY
APPLICATIONS**

Musse Mohamud Ahmed



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APPLICATIONS

Musse Mohamud Ahmed

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CHAPTER 28

MODELING, RESULTS AND ANALYSIS

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28.1 Permanent Magnet Synchronous Motor Modeling Using MATLAB

In Chapter 25 and 26, the PMSM is explained in detail. In this chapter using the equation of the permanent magnet motor, the simulation models of PMSM is programmed in Matlab Simulink. We used Ashley Power Motor data, which is the most efficient, compared to those of the other motors based on the analysis on the chapter 27. From the analysis, we came up with this simulation. The simulation model is presented and the results are discussed. In particular, the ability of the motor will be examined to synchronize with various values of magnetic fields. The PMSM parameters used in this part are given in Table 28.1. These parameters below were adapted from reference [14].

Table 28.1: Parameters of Line Start Motor in Per Unit

$H = 0.3s$	$r_s = 0.017pu$
$x_{ls} = 0.065pu$	$x_d = 0.543pu$
$x_q = 1.086pu$	$r'_{kd} = 0.054pu$
$r'_{kq} = 0.108pu$	$x'_{kd} = 0.132pu$
$x'_{kq} = 0.132pu$	$D_w = 0 pu$

For this simulation, there are advantages to choosing an appropriate per unit system, which per unit system is the expression of system quantities as fractions of a defined base unit quantity.