

The objective of this study is to study a new control structure for sensorless Double-Star Induction Motors (DSIM) dedicated to electrical drives using a three-level Voltage Source Inverter (VSI). The output voltages of the three-level VSI can be represented by four groups: the zero voltage vectors, the small voltage vectors, the middle voltage vectors and the large voltage vectors in (d, q) plane. Then, the amplitude and the rotating velocity of the flux vector can be controlled freely. Both fast torque and optimal switching logic can be obtained. The selection is based on the value of the stator flux and the torque. Both approaches, two level control and three level control, are simulated. The results obtained show superior performances over the FOC one without need to any mechanical sensor