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PERSPECTIVES OF INDUCTION MOTOR APPLICATION

Asynchronous motor is one of the greatest electro technical inventions of the 20th century. Because asynchronous motor is absolutely better than all other types of electric motors. Scientist all over the world one hundred percent sure that induction motors can easily replace all traditional types of motors which we know today.

The asynchronous motors are very common in all electro technical branches nowadays. The applications for its cover almost every stage of manufacturing and processing. Over 90% of the motors used in the world are asynchronous motors and they have huge applications all around, in a wide variety of domains. Some of them are: centrifugal fans, blowers and pumps, compressors, conveyors, textile and paper mills, lathe machines etc. And it's worth to add, about the use of technology of this motor in electric vehicles today. And this is just a small part of where these motors are used.

Moreover, motor design is pretty simple. Interesting that the basic design of induction motor has not changed very much in the last 40 years, the typical AC induction motor comprises 2 electromagnetic parts: stationary copper or aluminum part called the stator and the rotating part called the rotor, supported at each end on bearings.

When three phase stator winding of an induction motor is energized from a 3 phase supply, a rotating magnetic field is set up which rotates round the stator at synchronous speed ($N_s = 120 f/P$). The rotating field passes through the air gap and cuts the rotor conductors, which as yet, are stationary. Due to the relative speed between the rotating flux and the stationary rotor, e.m.f.s are induced in the rotor conductors. Since the rotor circuit is short-circuited, currents start flowing in the rotor conductors. The current-carrying rotor conductors are placed in the magnetic field produced by the stator. Consequently, mechanical force acts on the rotor conductors. The sum of the mechanical forces on all the rotor conductors produces a torque which tends to move the rotor in the same direction as the rotating field.

The fact that rotor is urged to follow the stator field (i.e., rotor moves in the direction of stator field) can be explained by Lenz's law. According to this law, the direction of rotor currents will be such that they tend to oppose the cause producing them. Now, the cause producing the rotor currents is the relative speed between the rotating field and the stationary rotor conductors. Hence to reduce this relative speed, the rotor starts running in the same direction as that of stator field and tries to catch it.

Three-phase squirrel-cage induction motor are so widely used because, first of all, they had a lot of constructive advantages, such as they are good self-starting and it has a high starting torque, secondly, they are very reliable and finally they are really low costly at maintenance. Induction machines are very cheap when compared to synchronous and DC motors. This is due to the modest design of induction motor. Therefore, these motors are overwhelmingly preferred for fixed speed applications in industrial applications and for commercial and domestic applications where AC line power can be easily attached. Induction motors are maintenance free motors unlike DC motors and synchronous motors. The construction of induction motor is very simple and hence maintenance is also easy, resulting in low maintenance cost.

Another major advantage an induction motor is that it is high starting torque. The starting torque of induction motor is very high which makes motor useful for operations where load is applied before the starting of the motor. 3 phase induction motors will have self-starting torque unlike synchronous motors. However, single-phase induction motors does not have self-starting torque and are made to rotate using some auxiliaries.

So, based on the above facts we can make a conclusion about a number of advantages and perspectives of using induction motor in householding and almost at every stage of manufacturing and processing at all. Because all modern induction motors are easy operation in practice, they are had an easy torque regulation and a right ability to connected directly to the AC source. Besides they are low cost maintenance and durability, reliable and having a low cost. Consequently, all these pros reveal the potential of induction motor application.