**Abstract**

Up to now always steady- state operation was presumed, i.e. operation on power system with constant voltage (DC-, AC or three phase system), constant speed and also without electrical switching operation and mechanical load variation. Such mode of operation nearly never occurs in real world applications, neither drive engineering nor at central electricity supply.

The electric machines are the main parts in drive engineering, which are the controlled system in the actuating system. Final controlling element- today mostly a static converter- and analog or digital control complete the drive system with speed control. DC motors are of minor importance nowadays, since recent advances in power semiconductor and microprocessor technology, which increased the relevance of induction- and EC- motors for electrical drives. High dynamic responses at acceleration of braking and a short setting time in case of mechanical load changes are demanded.

The induction motor model has been in use for many years and is well characterized both experimentally and theoretically. For control purposes the model is often expressed in an arbitrary two-axis rotating reference frame. This makes it easier for the control designer to fix the reference frame to a particular motor quantity and adjust the model accordingly.