

## TRANSFORMATION TERMS $abc$ TO $qdn$ FOR 9-PHASE SYSTEM WITH $3 \times 9$ MATRIX

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### ABSTRACT

*Order of the transformation matrix from  $abc$  coordinates to  $qdn$  for 9-phase induction motor was introduced in a square matrix form with order of  $9 \times 9$ . The size of this large matrix order can complicate the process of changing from 9-phase induction motor model of the form  $abc$  into  $qdn$  becomes less simple. Reducing matrix order obtains the efficiency of computation cost. In this paper we propose the unit vector relationships both  $abc$  and  $qdn$  coordinate transformation matrix obtained  $qdn$  term to order  $3 \times 9$  in order to reducing significant parameter. Through the simulation can be shown that the response of the same input and the reference rotary speed different angles on the order of  $3 \times 9$  coordinate transformation can produce a different response  $v_{qdn}$  voltage and output voltage  $v_{abc}$  is the same for each reference frame.*

*Keywords: Nine-phase system,  $abc$  coordinates,  $qdn$  coordinates, the  $3 \times 9$  transformation matrix*