**Claim rejection under 35 USC 102**

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –(a)(1) the claimed invention was patented, described in a printed publication, or in public use, on sale or otherwise available to the public before the effective filing date of the claimed invention.

**Claims 1-19 are rejected under 35 U.S.C. 102(a)(1) as being anticipated by XXXXX et al (US )**

**Claim rejection under 35 USC 103**

**The following is a quotation of 35 U.S.C. 103 which forms the basis for all obviousness rejections set forth in this Office action:**

A patent for a claimed invention may not be obtained, notwithstanding that the claimed invention is not identically disclosed as set forth in section 102 of this titleif the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimedinvention to a person having ordinary skill in the art to which the claimed invention pertains.Patentability shall not be negated by the manner in which the invention was made.

**Claims 1-11 are rejected under 35 U.S.C. 103 as being unpatentable over XXXXXXX (US 20160142003) in view of XXXXXXX. (US ).**

**Regarding claim 1**. An apparatus with motor speed estimation, the apparatus comprising:  
a motor speed estimator configured to estimate a motor speed based on a DC link voltage for driving a motor, a motor current flowing through the motor, and a voltage command; and a limiter configured to generate a current command based on the estimated motor speed, a torque command, and the DC link voltage.   
   
**Regarding claim 2**. The apparatus of claim 1, wherein the motor speed estimator comprises:  
a dead time voltage calculator configured to calculate a dead time voltage using the voltage command, the DC link voltage, and a motor current; a motor resistance and inductance voltage calculator configured to calculate a motor resistance voltage by resistance of the motor, and calculate a motor inductance voltage by inductance of the motor; and a calculator configured to calculate the motor speed based on the dead time voltage, the voltage command, the motor resistance voltage, the motor inductance voltage, and a preset motor counter electro-motive force constant.   
   
**Regarding claim 3**. The apparatus of claim 2, wherein the dead time voltage calculator comprises:  
a dead time voltage limit value calculator configured to calculate a dead time voltage limit value by applying a sign of the motor current, the DC link voltage, and a dead time ratio within a switching period; and a dead time voltage determiner configured to determine a dead time voltage according to states of the dead time voltage limit value and the voltage command.   
   
**Regarding claim 4**. The apparatus of claim 3, wherein the dead time voltage limit value calculator is further configured to calculate the dead time voltage limit value by multiplying the sign of the motor current, the DC link voltage, and the dead time ratio.   
   
**Regarding claim 5**. The apparatus of claim 3, wherein the dead time voltage determiner is further configured to:  
determine the dead time voltage as a value of the voltage command, in response to an absolute value of the voltage command being less than an absolute value of the dead time voltage limit value; determine the dead time voltage as a positive dead time voltage limit value, in response to the absolute value of the voltage command not being less than the absolute value of the dead time voltage limit value, and both of the voltage command and the dead time voltage limit value being positive numbers; determine the dead time voltage as a negative dead time voltage limit value, in response to the absolute value of the voltage command not being less than the absolute value of the dead time voltage limit value, and both of the voltage command and the dead time voltage limit value being negative numbers; determine the dead time voltage as a positive dead time voltage limit value, in response to the voltage command being a negative number and the dead time voltage limit value being a positive number; and determine the dead time voltage as a negative dead time voltage limit value, in response to the voltage command being a positive number and the dead time voltage limit value being a negative number.   
   
**Regarding claim 6**. The apparatus of claim 2, wherein the calculator comprises:  
a first calculator configured to output a motor applied voltage by performing a subtraction operation on the command voltage and the dead time voltage; a second calculator configured to subtract the motor resistance voltage and the motor inductance voltage from the motor applied voltage; and a third calculator configured to calculate the motor speed by dividing an output value of the second calculator by the motor counter electro-motive force constant.   
   
**Regarding claim 7**. The apparatus of claim 2, further comprising a noise remover configured to estimate a final motor speed by removing noise from the motor speed as calculated by the calculator.   
   
**Regarding claim 8**. The apparatus of claim 1, wherein the limiter comprises:  
a torque current converter configured to convert the torque command into the current command; a current limit value calculator configured to receive the motor speed and the DC link voltage, and calculate a current command limit value; and a current command outputter configured to limit a magnitude of the current command by using the current command as output from the torque current converter and the current command limit value as calculated by the current limit value calculator.   
   
**Regarding claim 9**. The apparatus of claim 8, wherein the current limit value calculator comprises:  
a first current limit value calculator configured to calculate a positive current limit value by subtracting a counter electro-motive force based on the motor speed from a positive DC link voltage, and dividing a resultant value of the subtracting of the counter electro-motive force from the positive DC link voltage by motor resistance; and a second current limit value calculator configured to calculate a negative current limit value by subtracting the counter electro-motive force based on the motor speed from a negative DC link voltage, and dividing the resultant value of the subtracting of the counter electro-motive force from the negative DC link voltage by the motor resistance.   
   
**Regarding claim 10**. The apparatus of claim 1, wherein the apparatus is included in a motor driven power steering system.   
   
**Regarding claim 11**. A method with motor speed estimation, the method comprising:  
estimating, by a motor speed estimator, a motor speed based on a DC link voltage for driving a motor, a motor current flowing through the motor, and a voltage command; and generating, by a limiter, a current command based on the estimated motor speed, a torque command, and the DC link voltage.   
   
**Regarding claim 12**. The method of claim 11, wherein the estimating of the motor speed comprises:  
calculating, by a dead time voltage calculator, a dead time voltage using the voltage command, the DC link voltage, and a motor current; calculating, by a motor resistance and inductance voltage calculator, a motor resistance voltage by resistance of the motor, and a motor inductance voltage by inductance of the motor; and calculating, by a calculator, the motor speed based on the dead time voltage, the voltage command, the motor resistance voltage, the motor inductance voltage, and a preset motor counter electro-motive force constant.   
   
**Regarding claim 13**. The method of claim 12, wherein the calculating of the dead time voltage comprises:  
calculating, by the dead time voltage calculator, a dead time voltage limit value by applying a sign of the motor current, the DC link voltage, and a dead time ratio within a switching period; and determining, by the dead time voltage calculator, a dead time voltage according to states of the dead time voltage limit value and the voltage command.   
   
**Regarding claim 14**. The method of claim 13, wherein the calculating of the dead time voltage limit value comprises calculating the dead time voltage limit value by multiplying the sign of the motor current, the DC link voltage, and the dead time ratio.   
   
**Regarding claim 15**. The method of claim 13, wherein the determining of the dead time voltage comprises:  
determining the dead time voltage as a value of the voltage command, in response to an absolute value of the voltage command being less than an absolute value of the dead time voltage limit value; determining the dead time voltage as a positive dead time voltage limit value, in response to the absolute value of the voltage command not being less than the absolute value of the dead time voltage limit value, and both of the voltage command and the dead time voltage limit value being positive numbers; determining the dead time voltage as a negative dead time voltage limit value, in response to the absolute value of the voltage command not being less than the absolute value of the dead time voltage limit value, and both of the voltage command and the dead time voltage limit value being negative numbers; determining the dead time voltage as a positive dead time voltage limit value, in response to the voltage command being a negative number and the dead time voltage limit value being a positive number, and determining the dead time voltage as a negative dead time voltage limit value, in response to the voltage command being a positive number and the dead time voltage limit value being a negative number.   
   
**Regarding claim 16**. The method of claim 12, wherein the calculating of the motor speed comprises:  
outputting, by the calculator, a motor applied voltage by performing a subtraction operation on the command voltage and the dead time voltage; and calculating, by the calculator, the motor speed by subtracting the motor resistance voltage and the motor inductance voltage from the motor applied voltage, and dividing, by the calculator, a resultant value of the subtracting of the motor resistance voltage and the motor inductance voltage from the motor applied voltage by the motor counter electro-motive force constant.   
   
**Regarding claim 17**. The method of claim 12, further comprising estimating, by a noise remover, a final motor speed by removing noise from the motor speed as calculated by the calculation unit.   
   
**Regarding claim 18**. The method of claim 11, wherein the generating of the current command comprises:  
converting, by a torque current converter, the torque command into the current command; receiving, by a current limit value calculator, the motor speed and the DC link voltage, and calculating, by the current limit value calculator, a current command limit value; and limiting, by a current command outputter, the magnitude of the current command by using the current command as output from the torque current converter and the current command limit value as calculated by the current limit value calculator.   
   
**Regarding claim 19**. The method of claim 18, wherein the calculating of the current command limit value comprises:  
calculating a positive current limit value by subtracting a counter electro-motive force based on the motor speed from a positive DC link voltage, and dividing a resultant value of the subtracting of the counter electro-motive force from the positive DC link voltage by motor resistance; and calculating a negative current limit value by subtracting the counter electro-motive force based on the motor speed from a negative DC link voltage, and dividing a resultant value of the subtracting of the counter electro-motive force from the negative DC link voltage by the motor resistance.   
   
**Regarding claim 20**. The method of claim 11, wherein the motor is a DC motor in a motor driven power steering system.