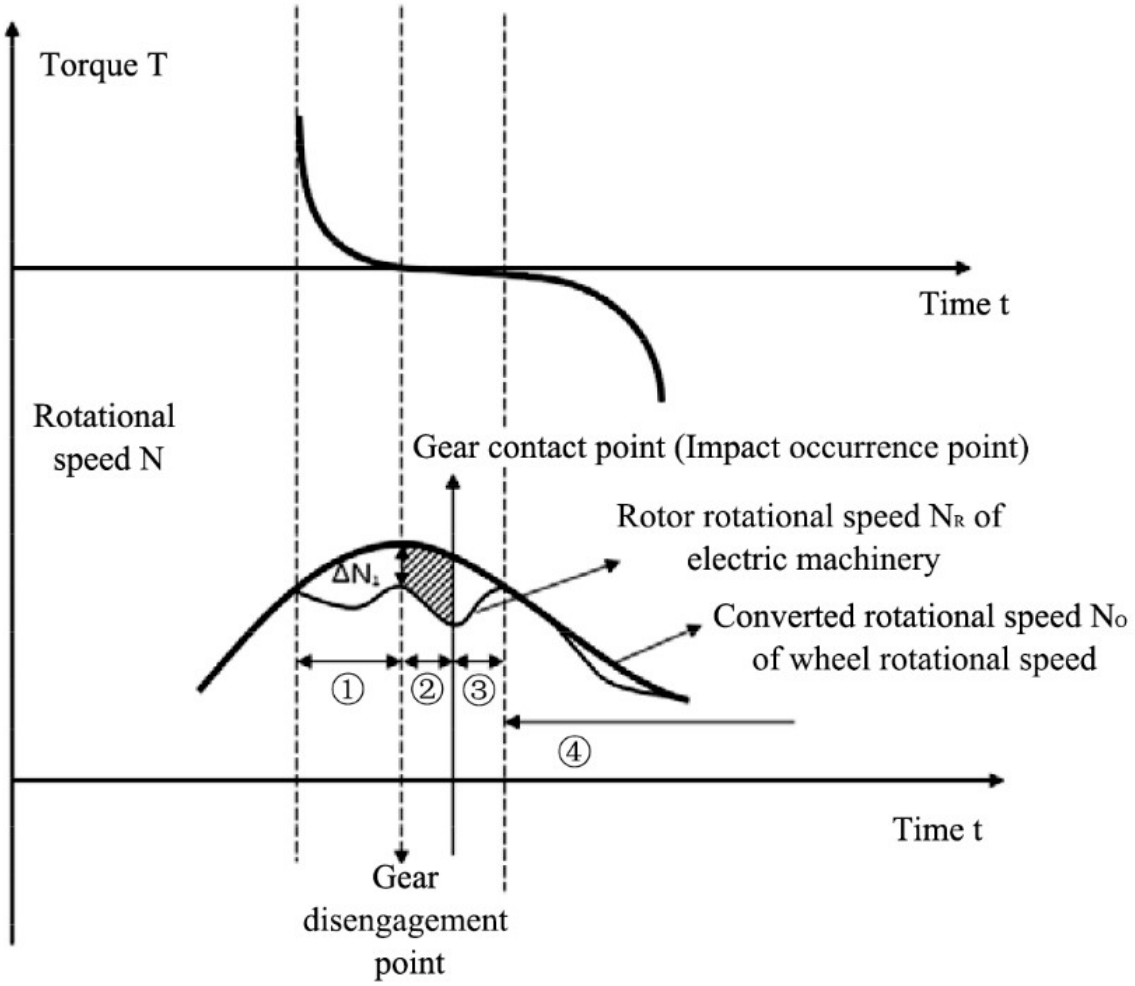

Torque T
Time t
Rotational speed N
Gear contact point (Impact occurrence point)
Rotor rotational speed N_R of electric machinery
ΔN_1
Converted rotational speed N_O of wheel rotational speed
①
②
③
④
Time t
Gear disengagement point

FIG. 1

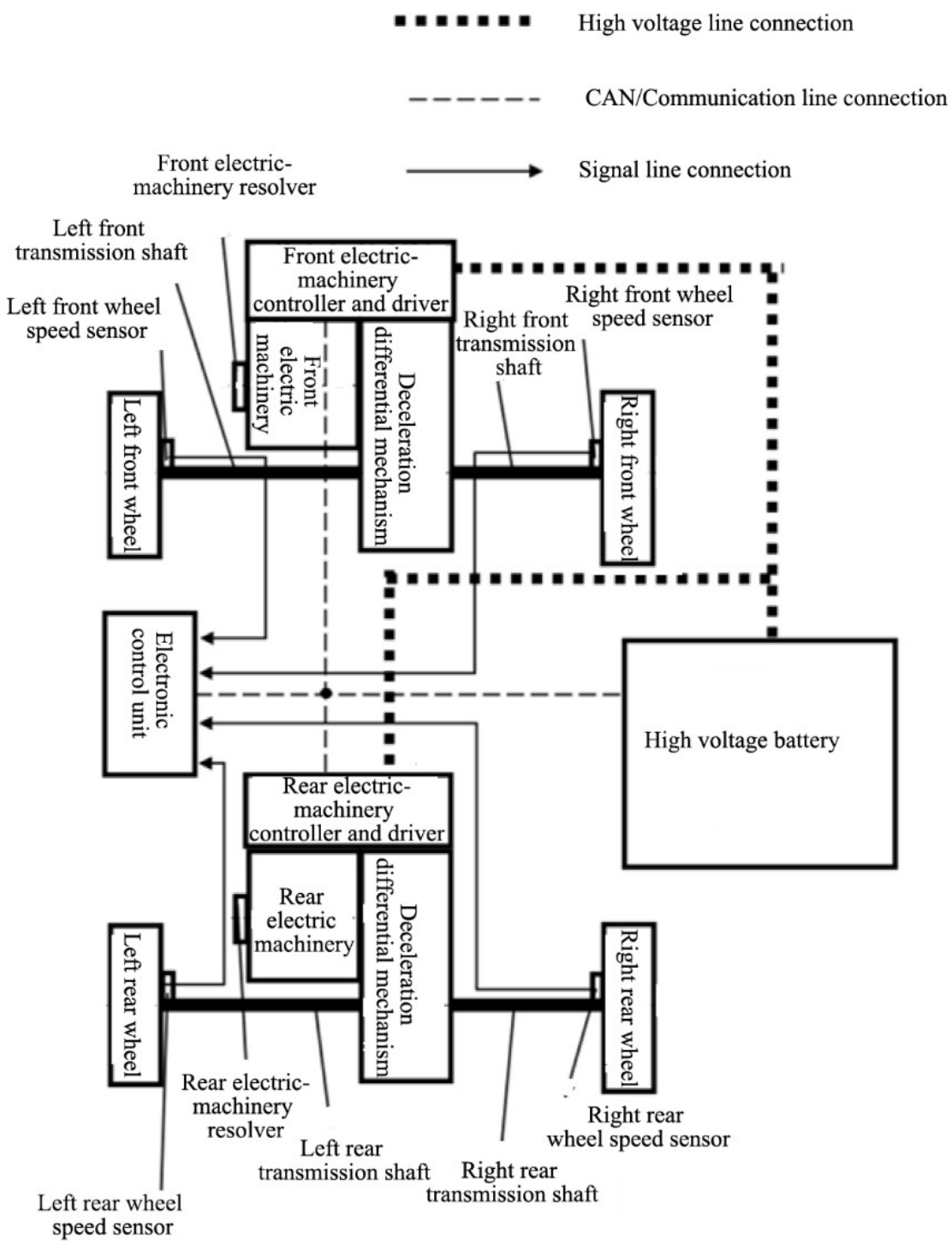

High voltage line connection
CAN/Communication line connection
Signal line connection
Front electric-machinery resolver
Left front transmission shaft
Front electric-machinery controller and driver
Left front wheel speed sensor
Right front wheel speed sensor
Right front transmission shaft
Front electric machinery
Deceleration differential mechanism
Left front wheel
Right front wheel
Electronic control unit
High voltage battery
Rear electric-machinery controller and driver
Rear electric machinery
Deceleration differential mechanism
Left rear wheel
Right rear wheel
Rear electric-machinery resolver
Left rear transmission shaft
Right rear transmission shaft
Right rear wheel speed sensor
Left rear wheel speed sensor

FIG. 2

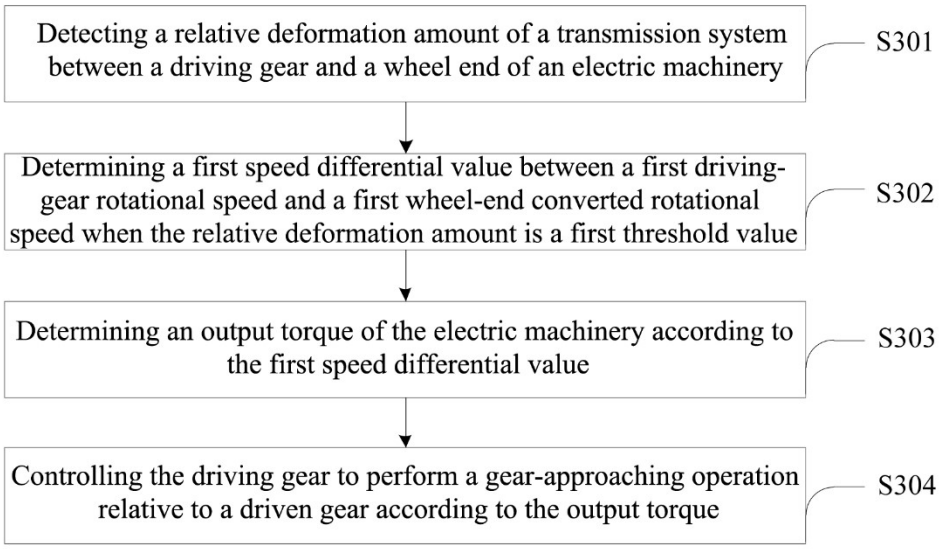

Detecting a relative deformation amount of a transmission system between a driving gear and a wheel end of an electric machinery
S301
Determining a first speed differential value between a first driving-gear rotational speed and a first wheel-end converted rotational speed when the relative deformation amount is a first threshold value
S302
Determining an output torque of the electric machinery according to the first speed differential value
S303
Controlling the driving gear to perform a gear-approaching operation relative to a driven gear according to the output torque
S304

FIG. 3

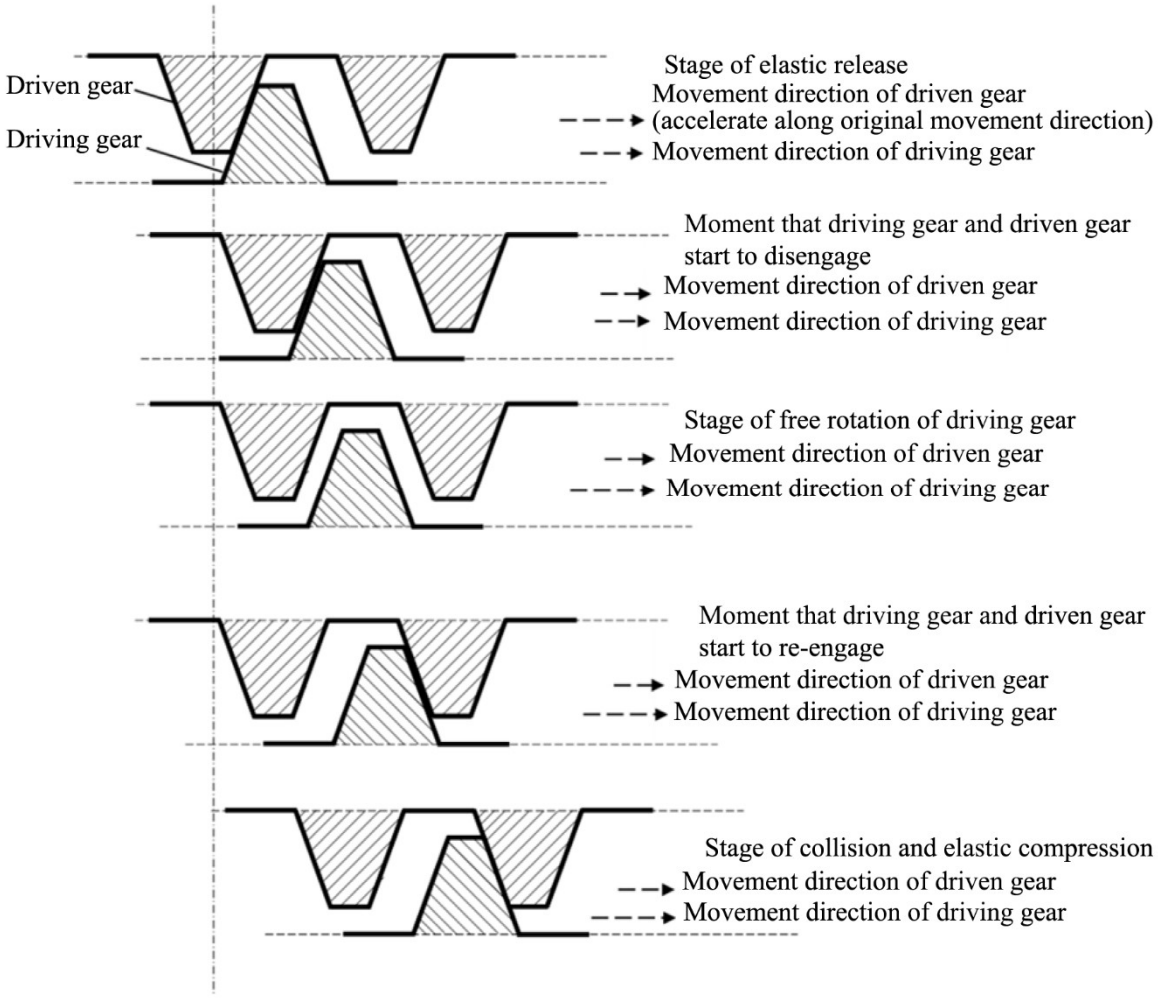

Driven gear
Driving gear
Stage of elastic release
Movement direction of driven gear
(accelerate along original movement direction)
Movement direction of driving gear
Moment that driving gear and driven gear start to disengage
Movement direction of driven gear
Movement direction of driving gear
Stage of free rotation of driving gear
Movement direction of driven gear
Movement direction of driving gear
Moment that driving gear and driven gear start to re-engage
Movement direction of driven gear
Movement direction of driving gear
Stage of collision and elastic compression
Movement direction of driven gear
Movement direction of driving gear

FIG. 4

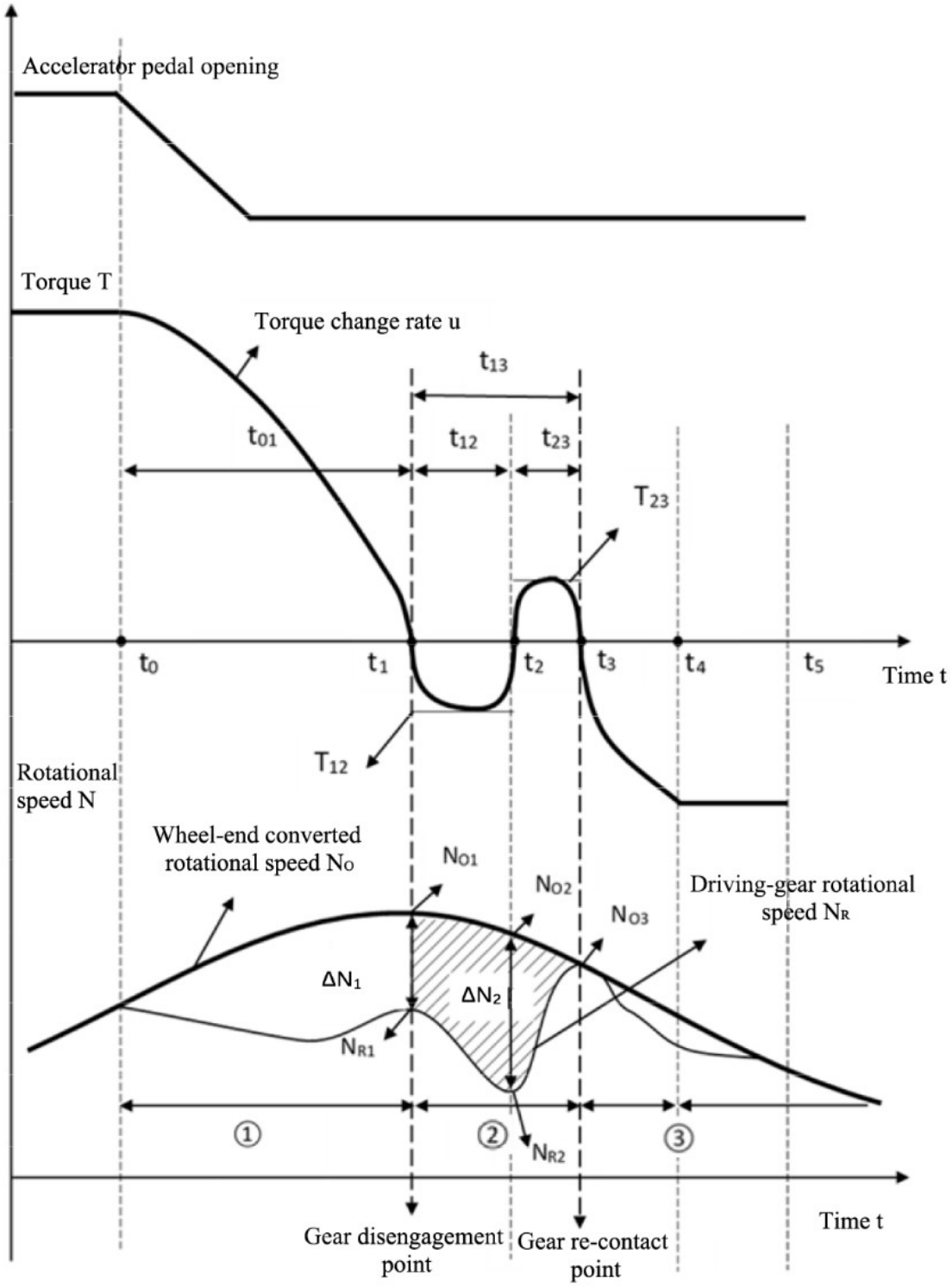

Accelerator pedal opening
Torque T
Torque change rate u
t13
t01
t12
t23
T23
t0
t1
t2
t3
t4
t5
Time t
T12
Rotational speed N
Wheel-end converted rotational speed No
No1
No2
No3
Driving-gear rotational speed NR
ΔN1
ΔN2
NR1
NR2
①
②
③
Gear disengagement point
Gear re-contact point
Time t

FIG. 5

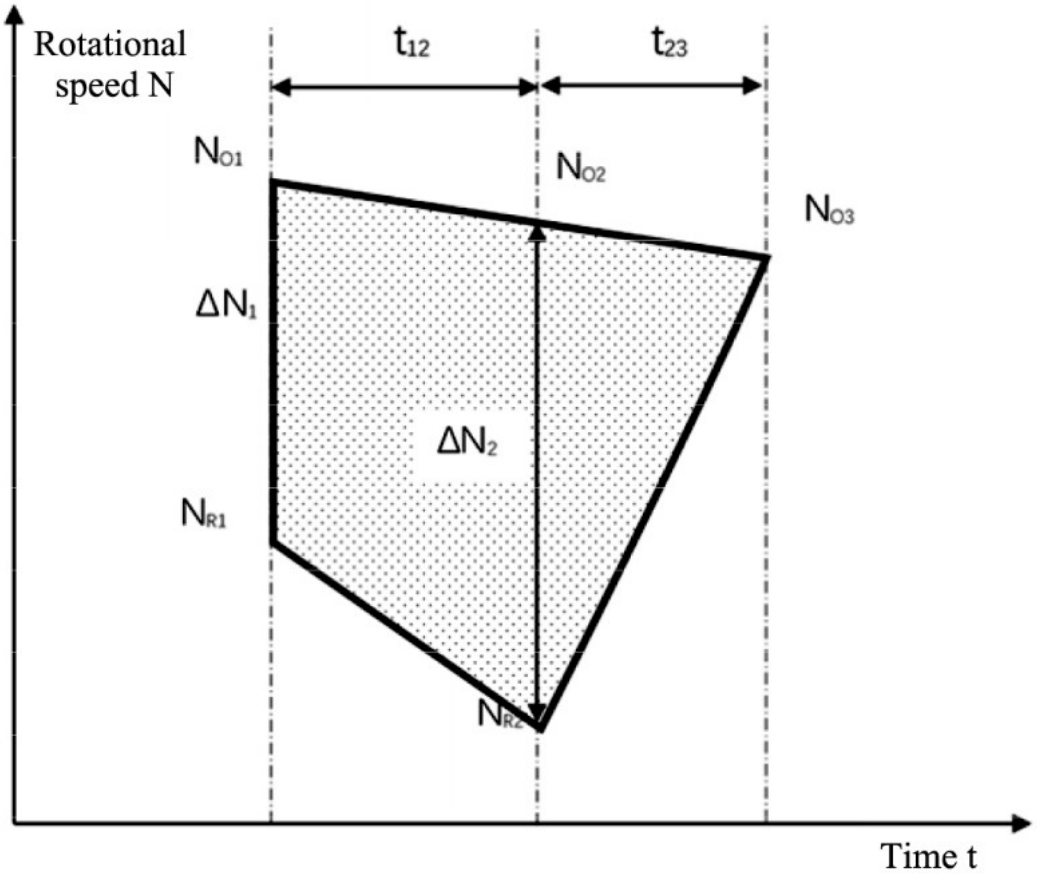


FIG. 6

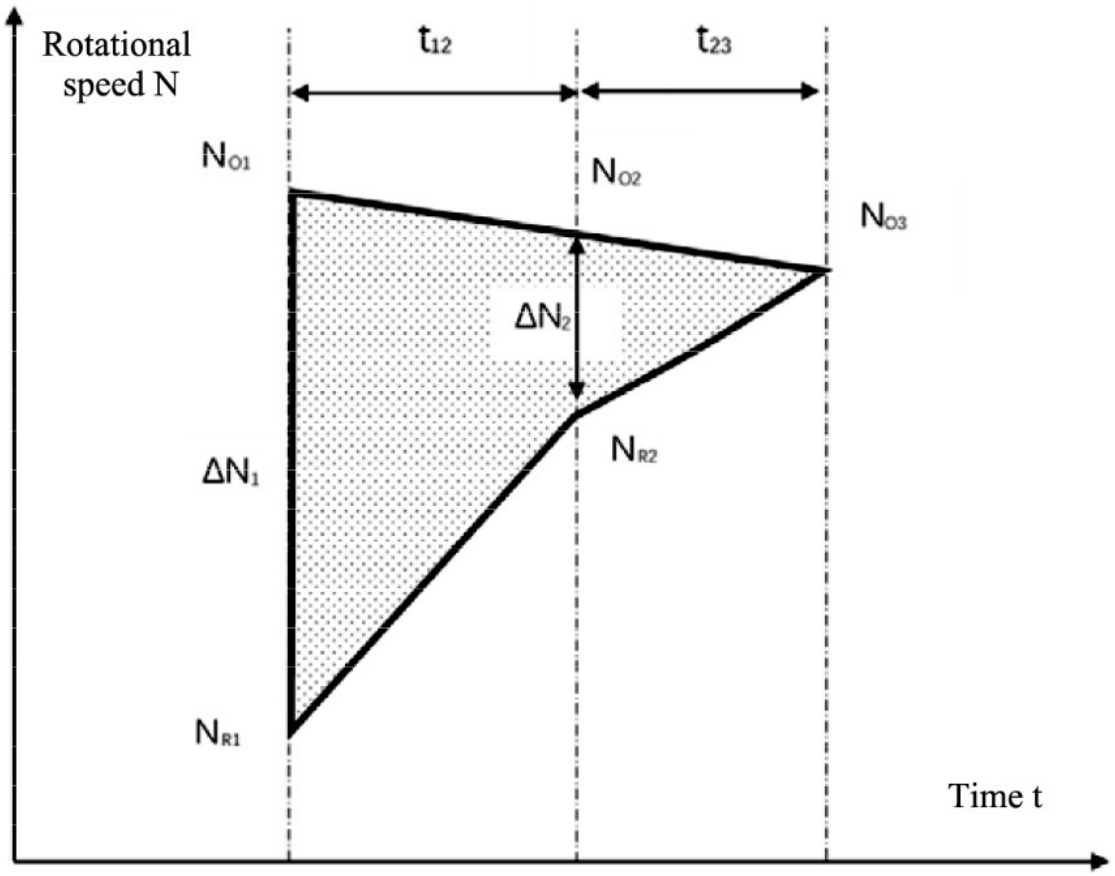


FIG. 7

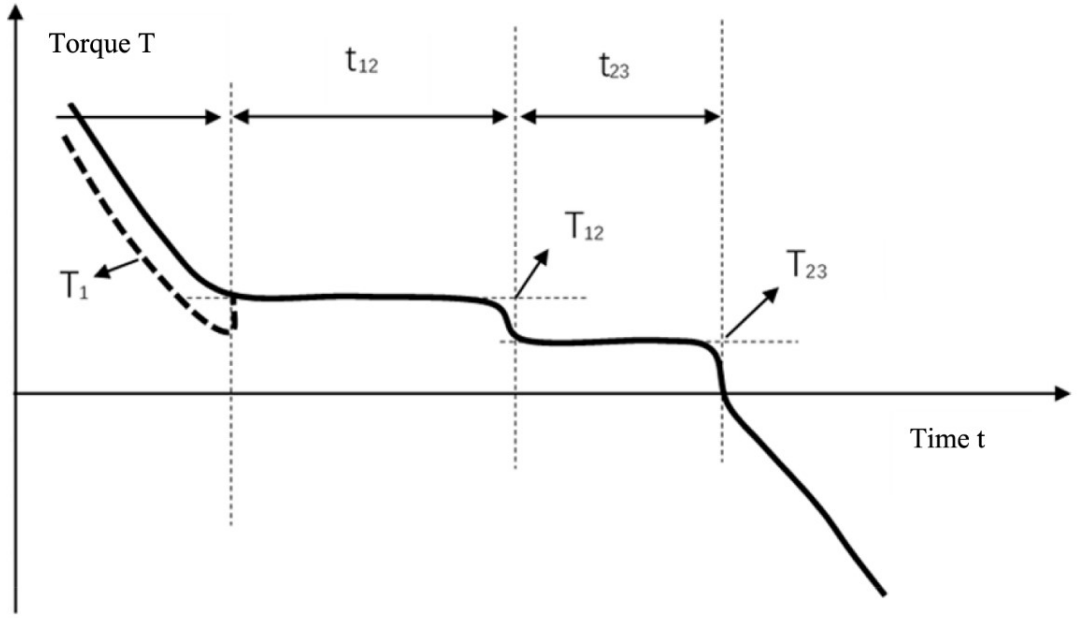

Torque T
t12
t23
T12
T23
T1
Time t

FIG. 8

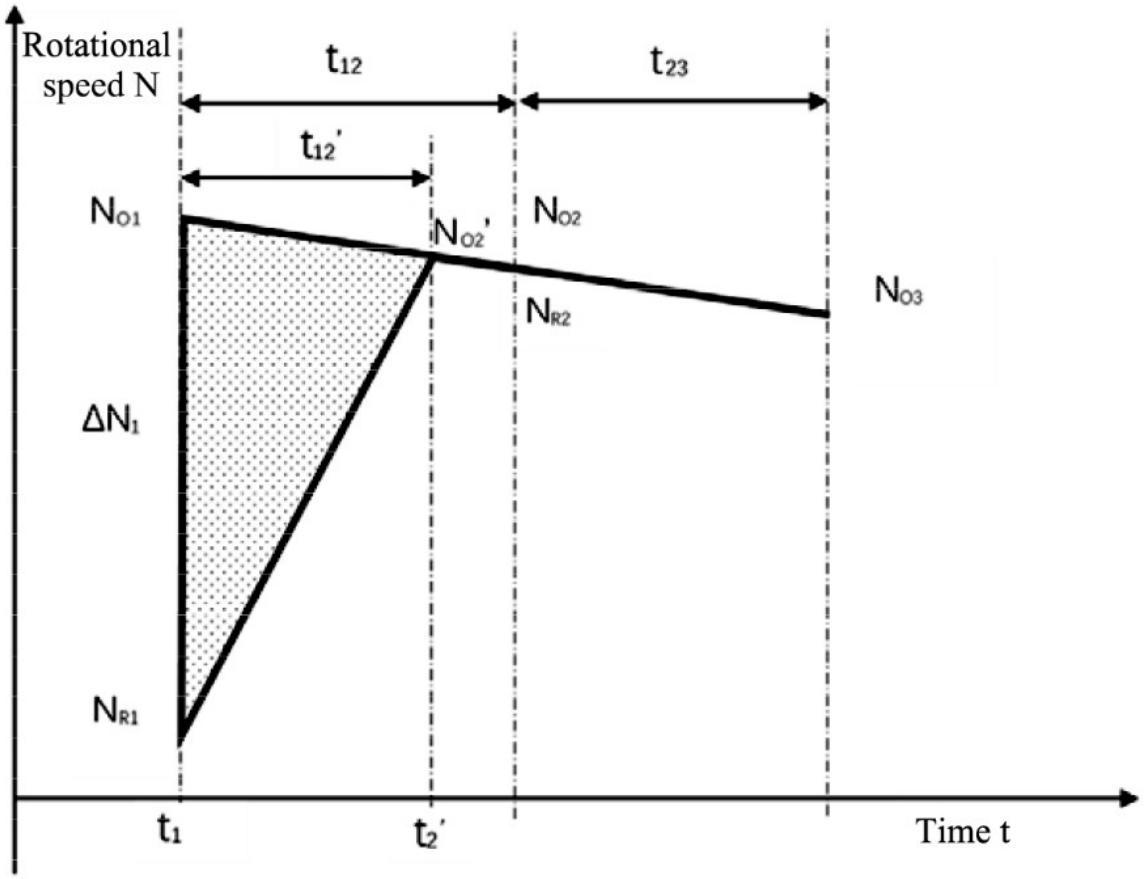

Rotational speed N
t12
t23
t12'
NO1
NO2'
NO2
NO3
NR2
ΔN1
NR1
t1
t2'
Time t

FIG. 9

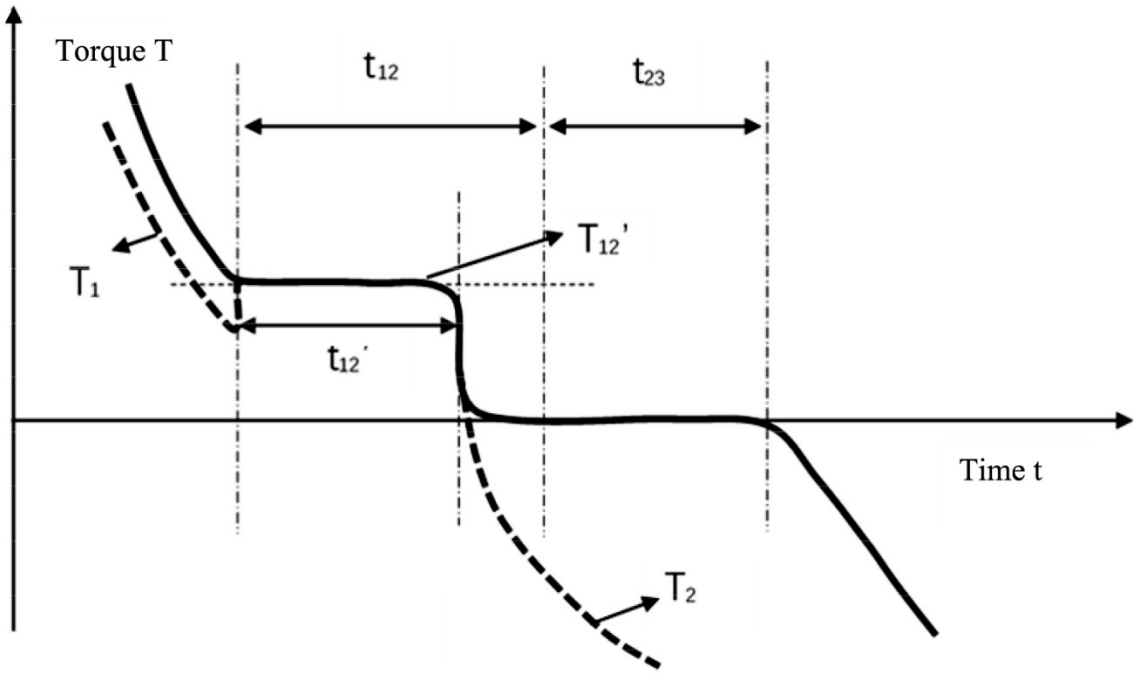


FIG. 10

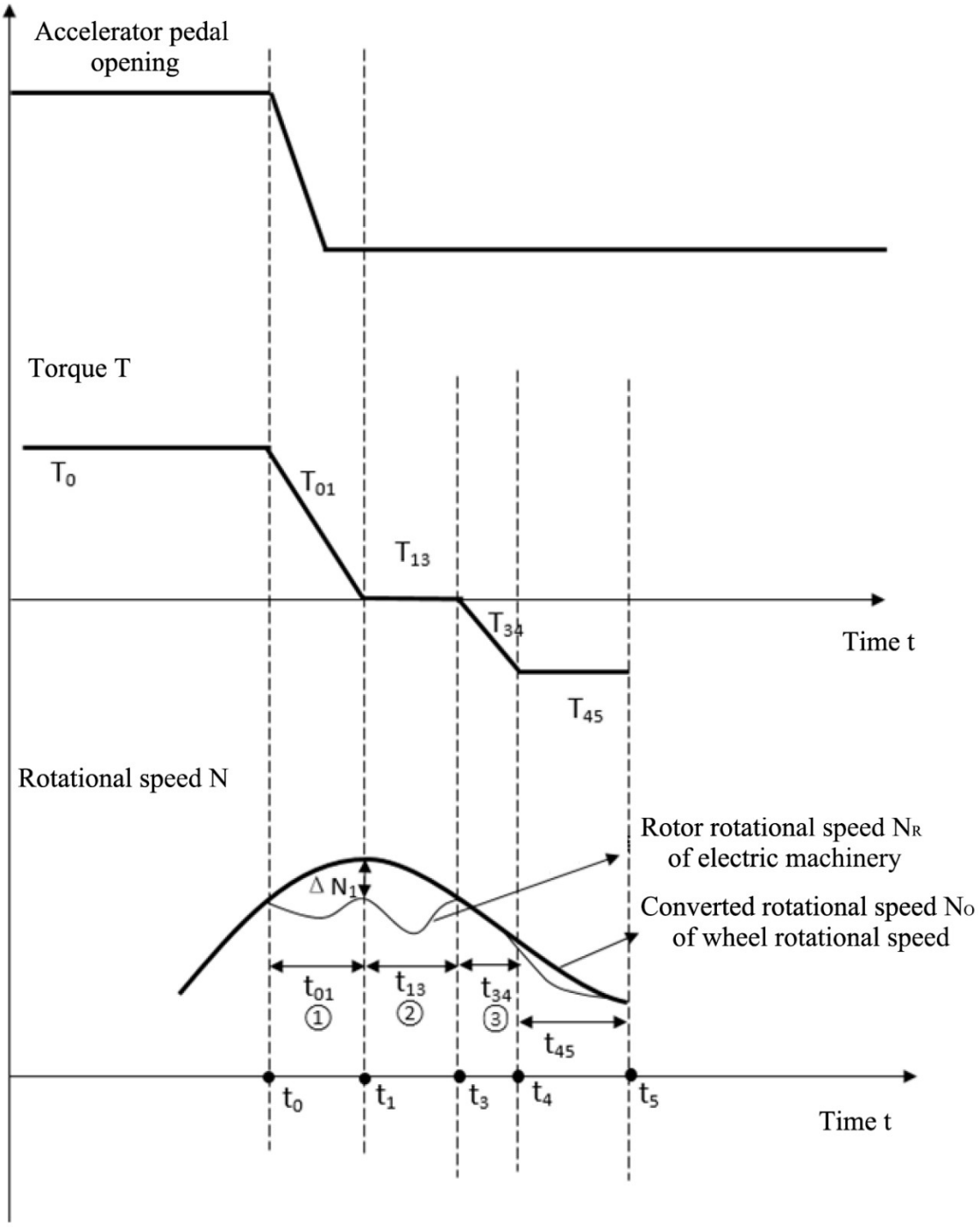

Accelerator pedal opening
Torque T
T0
T01
T13
T34
T45
Time t
Rotational speed N
Rotor rotational speed NR of electric machinery
Converted rotational speed NO of wheel rotational speed
Δ N1
t01 ①
t13 ②
t34 ③
t45
t0
t1
t3
t4
t5
Time t

FIG. 11

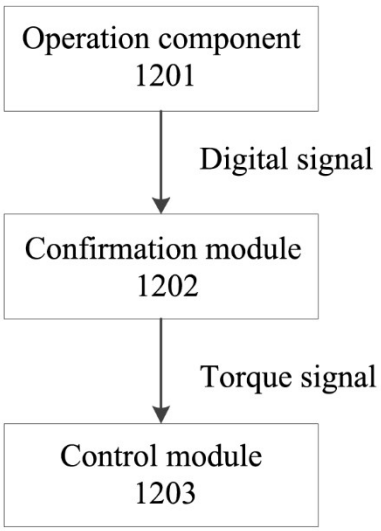


FIG. 12

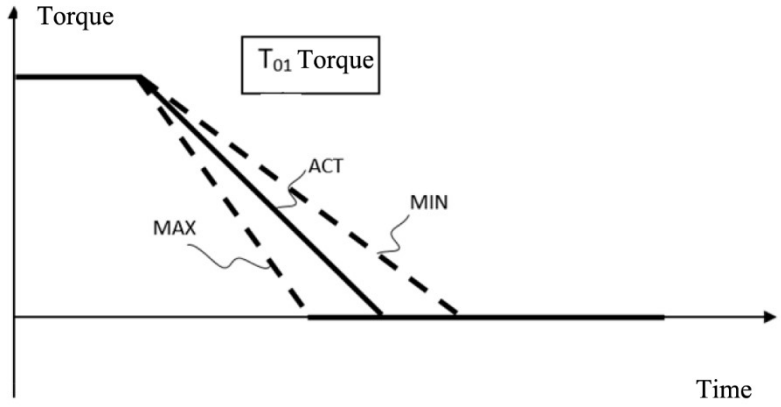


FIG. 13

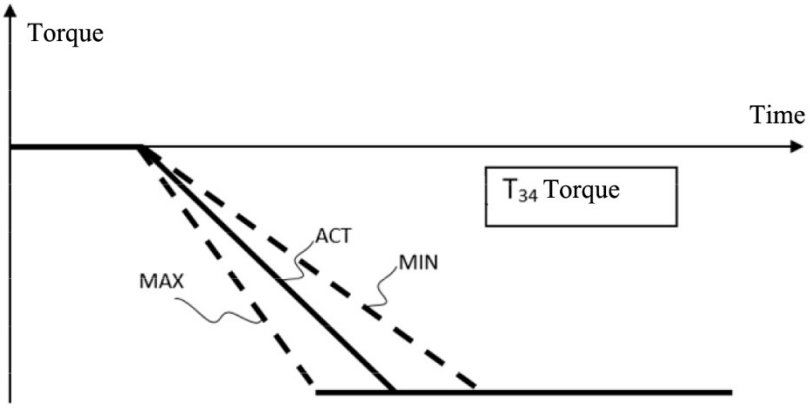


FIG. 14

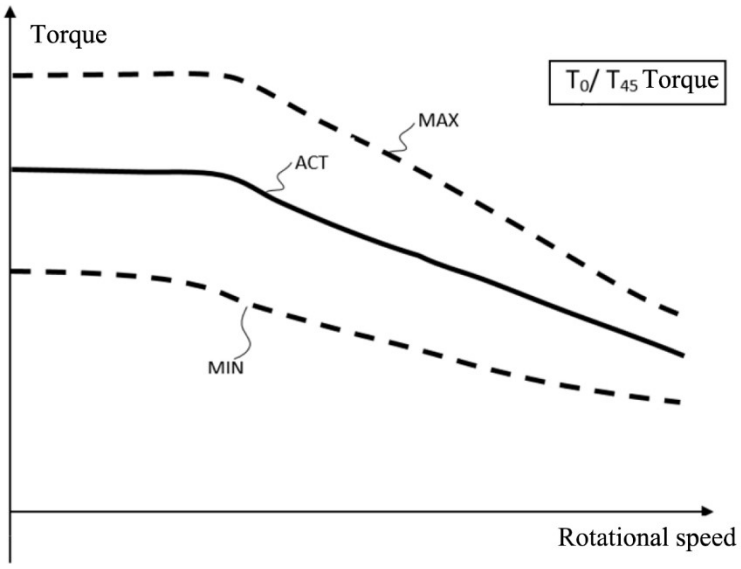


FIG. 15

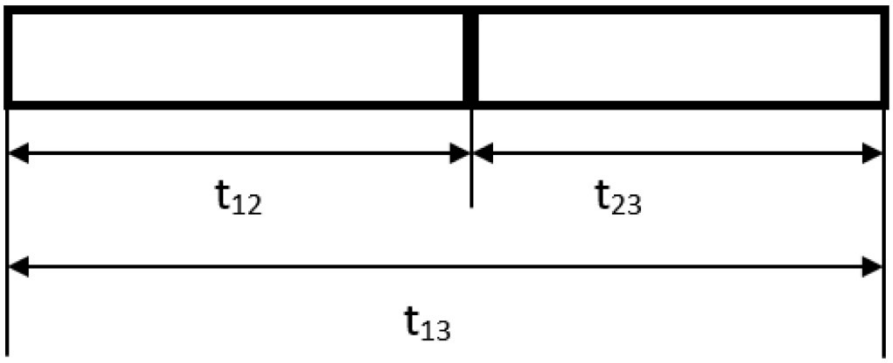


FIG. 16

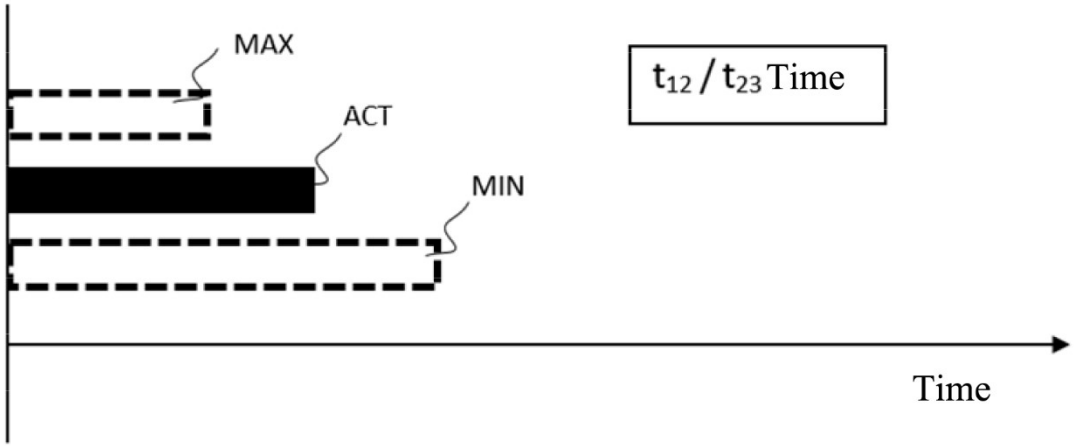


FIG. 17

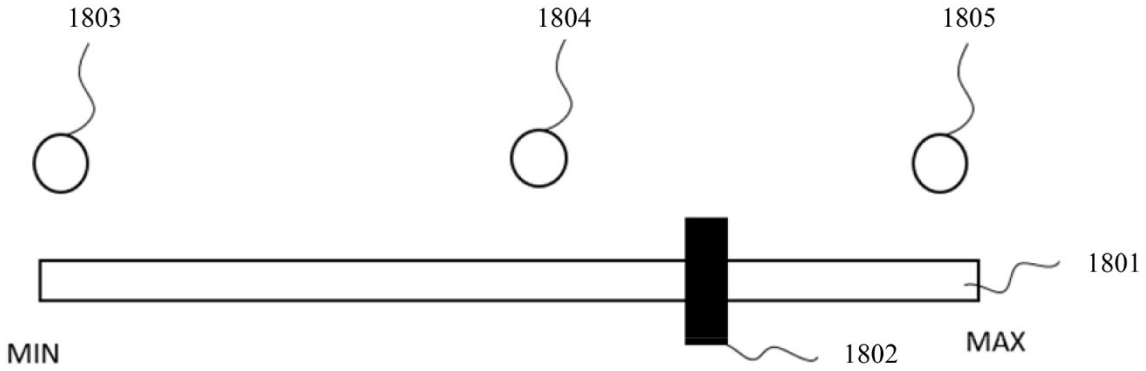

1803
1804
1805
1801
MIN
1802
MAX

FIG. 18

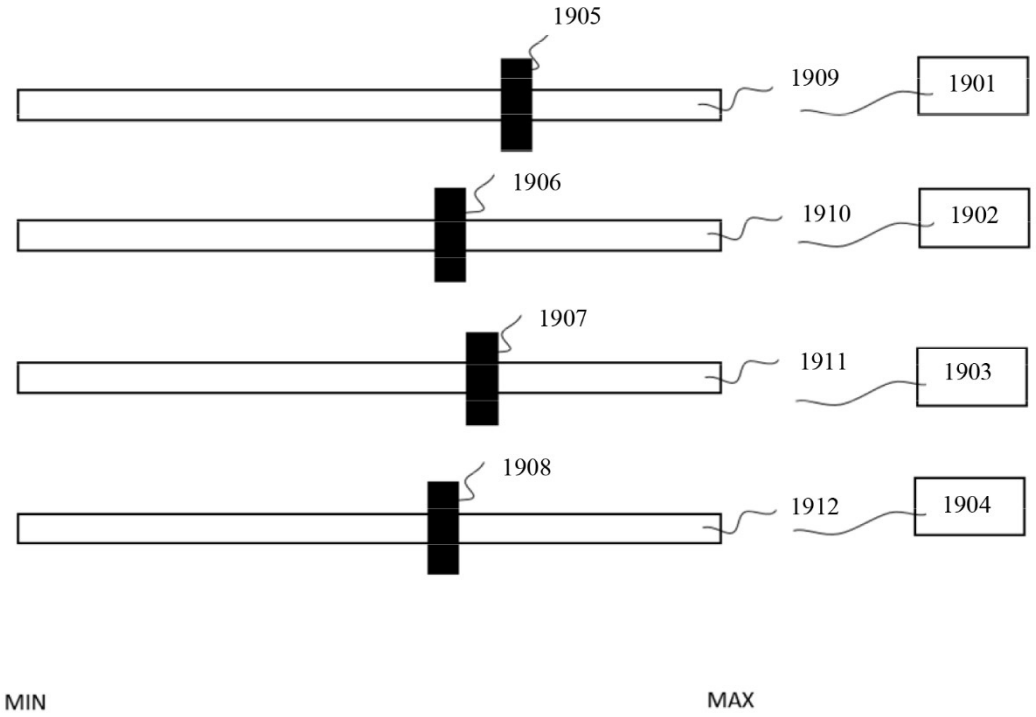

1905
1909
1901
1906
1910
1902
1907
1911
1903
1908
1912
1904
MIN
MAX

FIG. 19

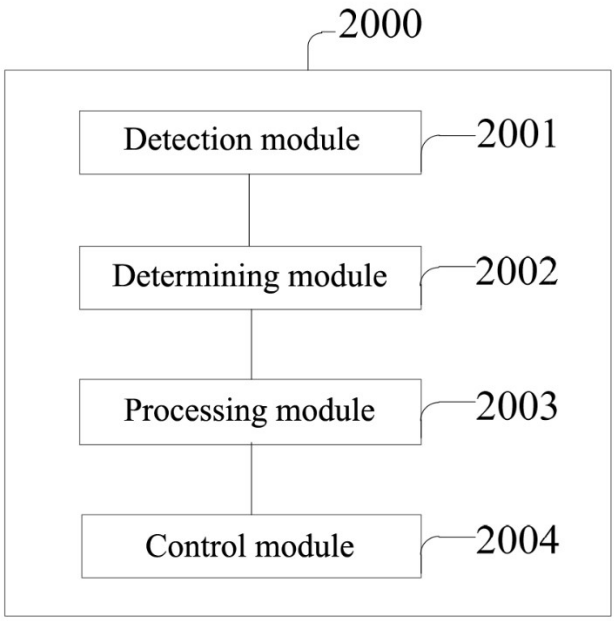

2000
Detection module
2001
Determining module
2002
Processing module
2003
Control module
2004

FIG. 20

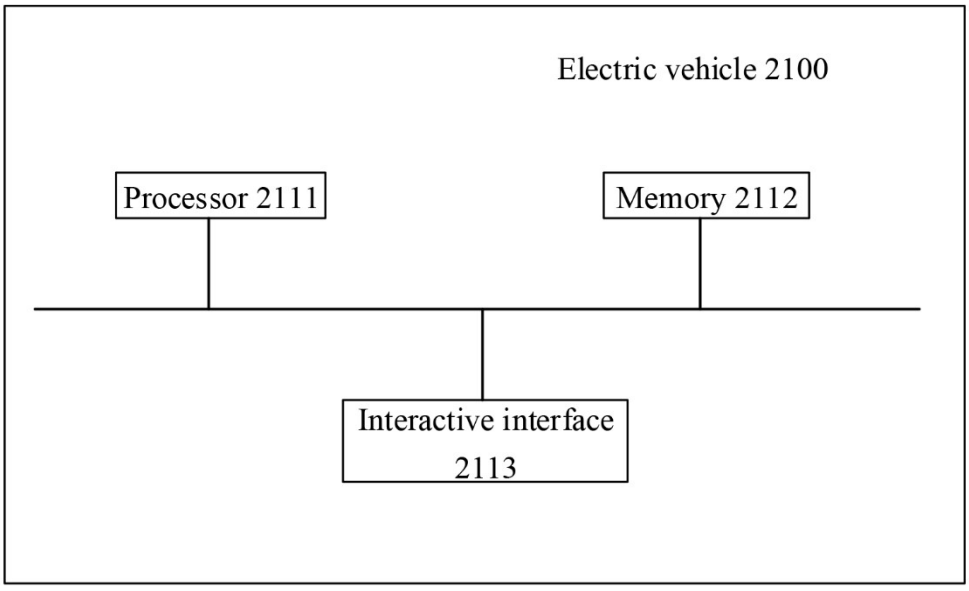

Electric vehicle 2100
Processor 2111
Memory 2112
Interactive interface
2113

FIG. 21