CLAIMS

1. A method for realizing intelligent constant-speed and energy-saving driving, wherein the method is applied to a central control unit, and comprises:

obtaining control information of a train when the train enters an intelligent constant-speed mode, wherein the control information comprises route information and train information; and

generating an automatic driving and energy-saving control strategy according to the control information while meeting a running time of normal operation of the train, and controlling operation of the train according to the automatic driving and energy-saving control strategy, wherein the generating an automatic driving and energy-saving control strategy according to the control information while meeting a running time of normal operation of the train comprises:

generating a first automatic driving and energy-saving control strategy, if the route information indicates that the train is running on a gentle route, wherein the first automatic driving and energy-saving control strategy is to control a speed of the train to rise from a given speed to a first speed by using maximum-power traction at a starting portion of the route, and to reduce the speed of the train from the first speed to a second speed through an idle running condition in remainder of the route, and to reduce the speed of the train from the second speed to zero by braking deceleration, wherein the first speed is less than a speed limit threshold, and the given speed is a speed when the train enters the intelligent constant-speed mode; and

generating a second automatic driving and energy-saving control strategy, if the route information indicates that the train is running on a complex route, wherein the complex route comprises an uphill route and/or a downhill route, and in a case that the complex route comprises the uphill route, the second automatic driving and energy-saving control strategy is to start speeding up the train by using the maximum-power traction within a preset distance before the train enters the uphill route; and in a case that the complex route comprises the downhill route, the second automatic driving and energy-saving control strategy is to control the speed of the train to drop by using the idle running condition within a preset distance before the train enters the downhill route.

2. The method according to claim 1, wherein the reducing the speed of the train from the second speed to zero by braking deceleration comprises:

reducing the speed of the train from the second speed to zero by means of electric braking.

3. The method according to claim 1, wherein the controlling the speed of the train to rise from a given speed to a first speed by using maximum-power traction at a starting portion of the route comprises:

planning a speed-time curve of the train according to the control information;

calculating resistance of the gentle route in real time to obtain a calculation result of the route resistance;

calculating a real-time output power according to the speed-time curve and the calculation result of the route resistance;

performing a matching calculation for power units according to the real-time output power to obtain a calculation result of power-matching; and

obtaining a power-switching instruction based on the calculation result of power-matching to control the power units to be turned on or off according to the calculation result of power-matching, wherein activation or shutdown of the power units allows the speed of the train to rise from the given speed to the first speed.

4. The method according to claim 1, further comprising:

determining whether the train meets a condition for entering the intelligent constant-speed mode;

determining whether an instruction of entering the intelligent constant-speed mode is received, if the condition for entering the intelligent constant-speed mode is met; and

performing the obtaining control information of the train, if the instruction of entering the intelligent constant-speed mode is received.

5. A device for realizing intelligent constant-speed and energy-saving driving, wherein the device is applied to a central control unit, and comprises:

an obtaining unit, configured to obtain control information of a train when the train enters an intelligent constant-speed mode, wherein the control information comprises route information and train information; and

a processing unit, configured to generate an automatic driving and energy-saving control strategy according to the control information on the basis of meeting a running time of normal operation of the train, and to control operation of the train according to the automatic driving and energy-saving control strategy, wherein the processing unit is configured to:

generate a first automatic driving and energy-saving control strategy, if the route information indicates that the train is running on a gentle route, wherein the first automatic driving and energy-saving control strategy is to control a speed of the train to rise from a given speed to a first speed by using maximum-power traction at a starting portion of the route, and to reduce the speed of the train from the first speed to a second speed through an idle running condition in remainder of the route, and to reduce the speed of the train from the second speed to zero by braking deceleration, wherein the first speed is less than a speed limit threshold, and the given speed is a speed when the train enters the intelligent constant-speed mode; and

generate a second automatic driving and energy-saving control strategy, if the route information indicates that the train is running on a complex route, wherein the complex route comprises an uphill route and/or a downhill route, and in a case that the complex route comprises the uphill route, the second automatic driving and energy-saving control strategy is to start speeding up the train by using the maximum-power traction within a preset distance before the train enters the uphill route; and in a case that the complex route comprises the downhill route, the second automatic driving and energy-saving control strategy is to control the speed of the train to drop by using the idle running condition within a preset distance before the train enters the downhill route.

6. The device according to claim 5, wherein the reducing the speed of the train from the

second speed to zero by braking deceleration in the processing unit comprises:

reducing the speed of the train from the second speed to zero by means of electric braking.

7. The device according to claim 5, wherein the processing unit is configured to:

plan a speed-time curve of the train according to the control information;

calculate resistance of the gentle route in real time to obtain a calculation result of the route resistance;

calculate a real-time output power according to the speed-time curve and the calculation result of the route resistance;

perform a matching calculation for power units according to the real-time output power to obtain a calculation result of power-matching; and

obtain a power-switching instruction based on the calculation result of power-matching to control the power units to be turned on or off according to the calculation result of power-matching, wherein activation or shutdown of the power units allows the speed of the train to rise from the given speed to the first speed.

8. The device according to claim 5, further comprising:

a first determining unit, configured to determine whether the train meets a condition for entering the intelligent constant-speed mode; and

a second determining unit, configured to determine whether an instruction of entering the intelligent constant-speed mode is received, if the condition for entering the intelligent constant-speed mode is met, wherein the obtaining control information of the train in the obtaining unit is performed, if the instruction of entering the intelligent constant-speed mode is received.