DESCRIPTION

Title of Invention: CHARGE/DISCHARGE CONTROL DEVICE AND CHARGE/DISCHARGE CONTROL METHOD

Technical Field

[0001]

The present disclosure relates to a charge/discharge control device and the like that controls charging/discharging of a power storage system.

Background Art

[0002]

In the related art, the technologies described in PTL 1 and PTL 2 are technologies for controlling charging/discharging of a power storage system (such as a storage battery).

Citation List

Patent Literature

[0003]

PTL 1: Japanese Unexamined Patent Application Publication No. 2008-178215

PTL 2: Japanese Unexamined Patent Application Publication No. 2011-55671

Summary of Invention

[0004]

However, in the case in which a power storage system is used to conduct frequency regulation (FR) to regulate the frequency of a power system, there is a possibility that the frequency of the power system may move farther away from the standard frequency due to reverse charge/discharge operations.

[0005]

Accordingly, the present disclosure provides a charge/discharge control device and the like able to minimize the occurrence of reverse operations in a storage battery for frequency regulation.

[0006]

In ~~one general~~ a first aspect, ~~the techniques disclosed here feature~~ a charge/discharge control device is provided, comprising ~~includes~~: a frequency measurer that measures a system frequency of a power system per a predetermined control period; a base frequency updater that update a base

frequency per the control period according

to the system frequency; a first frequency deviation calculator that calculates a first frequency deviation per the control period, the first frequency deviation indicating a difference between the base frequency and the system frequency; a command value determiner that determines a first power command value that indicates a charge/discharge power to make the system frequency approach the base frequency according to the first frequency deviation; and a charge/discharge controller that causes a power storage system to charge/discharge power according to the first power command value. The base frequency updater determines whether or not reverse operation will occur in the power storage system according to the base frequency, the system frequency, and a standard frequency of the power system, the reverse operation being charging/discharging that corresponds to a direction that moves the system frequency farther away from the standard frequency, in a case of determining that the reverse operation will not occur, sets a frequency obtained by applying a low-pass filter to temporal variation of the system frequency to the base frequency, and in a case of determining that the reverse operation will occur, sets the system frequency to the base frequency.

[0006a]

According to a second aspect, a charge/discharge control method is provided comprising: a charge/discharge control method comprising: measuring a system frequency of a power system per a predetermined control period; updating a base frequency per the control period according to the system frequency; calculating a first frequency deviation per the control period, the first frequency deviation indicating a difference between the base frequency and the system frequency; determining a first power command value that indicates a charge/discharge power to make the system frequency approach the base frequency according to the first frequency deviation; and causing a power storage system to charge/discharge power according to the first power command value; wherein the base frequency updating step determines whether or not reverse operation will occur in the power storage system according to the base frequency, the system frequency, and a standard frequency of the power system, the reverse operation being charging/discharging that corresponds to a direction that moves the system frequency farther away from the standard frequency, in a case of determining that the reverse operation will not occur, sets a frequency obtained by

applying a low-pass filter to temporal variation of the system frequency to the base frequency, and in a case of determining that the reverse operation will occur, sets the system frequency to the base frequency.

[0007]

Note that these general or specific aspects may also be realized by a system, method, integrated circuit, computer program, or non-transitory computer-readable recording medium such as a CD-ROM disc, and may also be realized by an arbitrary combination of a system, method, integrated circuit, computer program, and recording medium.

[0008]

A charge/discharge control device of the present disclosure may minimize the occurrence of reverse operations.

[0009]

[FIG. 1] FIG. 1 is a diagram illustrating charge/discharge command values in a reference example;

[FIG. 2] FIG. 2 is a system configuration diagram illustrating a frequency regulation system according to Embodiment 1;

[FIG. 3] FIG. 3 is a block diagram of a charge/discharge control device according to Embodiment 1;

[FIG. 4] FIG. 4 is a flowchart illustrating operations of a charge/discharge control device according to Embodiment 1;