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Patent Search

Invention Title	A METHOD FOR POWER SHARING IN DROOP-CONTROLLED HYBRID AC-DC SUBGRIDS
Publication Number	01/2021
Publication Date	01/01/2021
Publication Type	INA
Application Number	202041056154
Application Filing Date	23/12/2020
Priority Number	
Priority Country	
Priority Date	
Field Of Invention	ELECTRICAL
Classification (IPC)	H02J 9/06

Inventor

Name	Address	Country	Nationality
DR. K. NAGA SUJATHA	Jawaharlal Nehru Technological University, Hyderabad, India	India	India
DR. HARIKRISHNA MUDA	National Institute of Advanced Studies, IISc Campus, Bangalore, India	India	India
DR. C. BHARGAVA	Srindhi Institute of Science and Technology, Hyderabad, India	India	India
MR. T. MAHESH	Institute of Aeronautical Engineering, Hyderabad, India.	India	India

Applicant

Name	Address	Country	Nationality
DR. K. NAGA SUJATHA	Jawaharlal Nehru Technological University, Hyderabad, India	India	India
DR. HARIKRISHNA MUDA	National Institute of Advanced Studies, IISc Campus, Bangalore, India	India	India
DR. C. BHARGAVA	Srindhi Institute of Science and Technology, Hyderabad, India	India	India
MR. T. MAHESH	Institute of Aeronautical Engineering, Hyderabad, India.	India	India

Abstract:

ABSTRACT A METHOD FOR POWER SHARING IN DROOP-CONTROLLED HYBRID AC-DC SUBGRIDS The present disclosure pertains to a droop control based power sharing method (110) to distribute power across a hybrid grid AC-DC subgrids. The method is applied to a hybrid grid consisting of a number of AC and DC subgrids connected with bidirectional interlinking converters (111). The method involves, measuring the terminal voltages (112) of the Direct Current subgrid connected to the grid and the frequency (113) of the Alternating Current subgrid connected to the grid. The droop gain values for AC subgrid and DC subgrid are calculated based on the measured voltage and frequency values. The frequency of the Alternating Current and the terminal Voltages of the Direct Current are then normalized (114) to a common per unit range for controlling the flow of the current through the interlinking converter (115). The controlling is done based on the droop gain normalized alternating current frequency and the direct current terminal voltage values. Fig. 5. Hybrid multiple subgrids.

Complete Specification

Claims:We claim:

1. A method for power-sharing in Droop Controlled Hybrid AC-DC Subgrid, involving the steps of, establishing a connection between one or more of a Direct Current subgrid, and one or more of an Alternating Current Subgrid with an Interlinking Converter wherein an Interlinking converter is positioned at every connection point; measuring the terminal voltages of the Direct Current subgrid connected to the grid; measuring the frequency of the Alternating Current subgrid connected to the grid; calculating the droop gain values for AC subgrid and DC subgrid based on the measured voltage and frequency values; normalizing, the frequency of the Alternating Current and the terminal Voltages of the Direct Current to a common per unit range; controlling the flow of the current through the interlinking converter based on the droop gain normalized alternating current frequency and the direct current terminal voltage values.
2. The method for power-sharing in Droop Controlled Hybrid AC-DC Subgrid as claimed in claim 1, wherein the current controller is a traditional proportional integral controller.
3. The method for power-sharing in Droop Controlled Hybrid AC-DC Subgrid as claimed in claim 1, wherein, the Interlinking Converter is bidirectional and permits the flow of current in any direction based on the droop gain characteristics.
4. The method for power-sharing in Droop Controlled Hybrid AC-DC Subgrid as claimed in claim 1, wherein, the subgrids are operable in the grid or as islanded with

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Application Details

APPLICATION NUMBER	202041056154
APPLICATION TYPE	ORDINARY APPLICATION
DATE OF FILING	23/12/2020
APPLICANT NAME	1 . DR. K. NAGA SUJATHA 2 . DR. HARIKRISHNA MUDA 3 . DR. C. BHARGAVA 4 . MR. T. MAHESH
TITLE OF INVENTION	A METHOD FOR POWER SHARING IN DROOP-CONTROLLED HYBRID AC-DC SUBGRIDS
FIELD OF INVENTION	ELECTRICAL
E-MAIL (As Per Record)	patent.trademark1@gmail.com
ADDITIONAL-EMAIL (As Per Record)	drsivashankars@gmail.com
E-MAIL (UPDATED Online)	
PRIORITY DATE	
REQUEST FOR EXAMINATION DATE	24/02/2021
PUBLICATION DATE (U/S 11A)	01/01/2021
REPLY TO FER DATE	10/06/2021

Application Status

APPLICATION STATUS	Reply Filed. Application in amended examination
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➡ Filed ➡ Published ➡ RQ Filed ➡ Under Examination ➡ Disposed

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FORM 1 THE PATENTS ACT 1970 (39 of 1970) & The Patents rules, 2003 APPLICATION FOR GRANT OF PATENT [See section 7, 54 & 135 and rule 20 (1)]	(FOR OFFICE USE ONLY) Application No: Filing Date: Amount of Fee Paid: CBR No: Signature:																				
1. APPLICANT'S REFERENCE / IDENTIFICATION NO. (AS ALLOTTED BY OFFICE)																					
2. TYPE OF APPLICATION [Please tick (√) at the appropriate category]																					
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3. (3A) APPLICANT																					
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 30%;">Name</th> <th style="width: 10%;">Nationality</th> <th style="width: 10%;">Country of Residence</th> <th style="width: 50%;">Address</th> </tr> </thead> <tbody> <tr> <td>1. DR. K. NAGA SUJATHA</td> <td style="text-align: center;">IN</td> <td style="text-align: center;">IN</td> <td>Jawaharlal Nehru Technological University, Hyderabad, Indi</td> </tr> <tr> <td>2. DR. HARIKRISHNA MUDA</td> <td style="text-align: center;">IN</td> <td style="text-align: center;">IN</td> <td>National Institute of Advanced Studies, IISc Campus, Bangalore, India</td> </tr> <tr> <td>3. DR. C. BHARGAVA</td> <td style="text-align: center;">IN</td> <td style="text-align: center;">IN</td> <td>Srindhi Institute of Science and Technology, Hyderabad, India</td> </tr> <tr> <td>4. MR. T. MAHESH</td> <td style="text-align: center;">IN</td> <td style="text-align: center;">IN</td> <td>Institute of Aeronautical Engineering, Hyderabad, India.</td> </tr> </tbody> </table>		Name	Nationality	Country of Residence	Address	1. DR. K. NAGA SUJATHA	IN	IN	Jawaharlal Nehru Technological University, Hyderabad, Indi	2. DR. HARIKRISHNA MUDA	IN	IN	National Institute of Advanced Studies, IISc Campus, Bangalore, India	3. DR. C. BHARGAVA	IN	IN	Srindhi Institute of Science and Technology, Hyderabad, India	4. MR. T. MAHESH	IN	IN	Institute of Aeronautical Engineering, Hyderabad, India.
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3B. CATEGORY OF APPLICANT [Please tick (√) at the appropriate category]																					
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	Small Entity ()	Start up ()	Others ()																		

4. INVENTOR (S) [Please tick (√) at the appropriate category]

Are all the inventor(s) same as the applicant(s) named above?	Yes (√)	NO ()
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If "No", furnish the details of the inventor(s)

Name	Nationality	Country of Residence	Address

5. TITLE OF THE INVENTION

**A METHOD FOR POWER SHARING IN DROOP-CONTROLLED HYBRID
AC-DC SUBGRIDS**

6. AUTHORISED REGISTERED PATENT AGENT(S)

IN/PA No.

Name

Mobile No.

7. ADDRESS FOR SERVICE OF APPLICANT IN INDIA

DR. K. NAGA SUJATHA , Jawaharlal Nehru
Technological University, Hyderabad, India.

Telephone No. NA

Mobile No. **+91 7303346331**

E-mail: patent.trademark1@gmail.com
patent.trademark@gmail.com

8. IN CASE OF APPLICATION CLAIMING PRIORITY OF APPLICATION FILED IN CONVENTION COUNTRY, PARTICULARS OF CONVENTION APPLICATION

Country	Application Number	Filing date	Name of the applicant	Title of the invention	IPC (as classified in the convention country)
-NA-	-NA-	-NA-	-NA-	-NA-	-NA-

9. IN CASE OF PCT NATIONAL PHASE APPLICATION, PARTICULARS OF INTERNATIONAL APPLICATION FILED UNDER PATENT CO-OPERATION TREATY (PCT)

International application number

International filing date

-NA-

-NA-

10. IN CASE OF DIVISIONAL APPLICATION FILED UNDER SECTION 16,

PARTICULARS OF ORIGINAL (FIRST) APPLICATION	
Original (first) application No	Date of filing of original (first) application
-NA-	-NA-
11. IN CASE OF PATENT OF ADDITION FILED UNDER SECTION 54, PARTICULARS OF MAIN APPLICATION OR PATENT	
Main application/patent No.	Date of filing of main application
-NA-	-NA-
12. DECLARATIONS:	
<p>(i) Declaration by inventor (s)</p> <p>(In case the applicant is an assignee: the inventor(s) may sign herein below or the applicant may upload the assignment or enclose the assignment with this application for patent or send the assignment by post/electronic transmission duly authenticated within the prescribed period).</p> <p>I/We, the above-named inventor(s) is/are the true & first inventor(s) for this Invention and declare that the applicant(s) herein is/are my/our assignee or legal representative.</p> <p>(a) Date:</p> <p>(b) Signature:</p> <p>(c) Name: DR. K. NAGA SUJATHA DR. HARIKRISHNA MUDA</p> <p>MAHESH DR. C. BHARGAVA MR. T.</p>	
<p>(ii)Declaration by the applicant(s) in the convention country</p> <p>(In case the applicant in India is different than the applicant in the convention country: the applicant in the convention country may sign herein below or applicant in India may upload the assignment from the applicant in the convention country or enclose the said assignment with this application for patent or send the assignment by post/electronic transmission duly authenticated within the prescribed period)</p> <p>I/We, the applicant(s) in the convention country declare that the applicant(s) herein is/are my/our assignee or legal representative.</p>	

- (a) Date
 (b) Signature(s) -----NA-----
 (c) Name(s) of the signatory

(ii) Declaration by the applicant:

I/We, the applicant hereby declares that:-

- I am /we are in possession of the above-mentioned invention
- The provisional/complete specification relating to the invention is filed with this application.
- ~~The invention as disclosed in the specification uses the biological material from India and the necessary permission from the competent authority shall be submitted by me/us before the grant of patent to me/us.~~
- There is no lawful ground of objection to the grant of the patent to me/us.
- I am/we are the true & first inventor(s).
- I am/we are the assignee or legal representative of true & first inventor(s).
- ~~The application or each of the applications, particulars of which are given in Paragraph-8, was the first application in convention country/countries in respect of my/our invention(s).~~
- ~~I/We claim the priority from the above mentioned application(s) filed in convention country/countries and state that no application for protection in respect of the invention had been made in a convention country before that date by me/us or by any person from which I/We derive the title.~~
- ~~My/our application in India is based on international application under Patent Cooperation Treaty (PCT) as mentioned in Paragraph-9.~~
- ~~The application is divided out of my /our application particulars of which is given in Paragraph-10 and pray that this application may be treated as deemed to have been filed on DD/MM/YYYY under section 16 of the Act.~~
- The said invention is an improvement in or modification of the invention particulars of which are given in Paragraph-11.

(d) Following are the attachments with the application:

- (a) Form 2

Item	Detail	Fee	Remark
Complete specification	No. of pages: 16	1, 600	
No. of	No. of claims: 7		

Claim(s)	No. of pages: 2		
Abstract	No. of pages: 1		
Drawings	No. of drawings: 7 No. of Pages: 5		
Priority	No. of Priorities:		

~~In case of a complete specification, if the applicant desires to adopt the drawings filed with his provisional specification as the drawings or part of the drawings for the complete specification under rule 13(4), the number of such pages filed with the provisional specification are required to be mentioned here.~~

- (a) ~~Provisioanl specification (in conformation with the international application)/as amended before the International Preliminary Examination Authority (IPEA), as applicable (2 copies).~~
- (b) ~~Sequence listing in electronic form~~
- (c) ~~Drawings (in conformation with the international application)/as amended before the International Preliminary Examination Authority (IPEA), as applicable (2 copies).~~
- (d) ~~Priority document(s) or a request to retrieve the priority document(s) from DAS (Digital Access Service) if the applicant had already requested the office of first filing to make the priority document(s) available to DAS.~~
- (e) ~~Translation of priority document/Specification/International Search Report/International Preliminary Report on Patentability.~~
- (f) ~~Statement and Undertaking on Form 3~~
- (g) ~~Declaration of Inventorship on Form 5~~

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We hereby declare that to the best of my/our knowledge, information and belief the fact and matters slated herein are correct and I/We request that a patent may be granted to me/us for the said invention.

Dated this 23th day of Dec, 2020

(a) Name of applicant: DR. K. NAGA SUJATHA
MUDA

DR. HARIKRISHNA

Name of applicant: DR. C. BHARGAVA
MAHESH

MR. T.

To,
The Controller of Patents
The Patent Office, at Chennai.