Universidad Carlos III de Madrid

OO/UC3M/10 - POWER INVERTER FOR PHOTOVOLTAIC PLANT AND EXPERTISE IN POWER CONTROL FOR WIND GENERATORS

The Power System Control Group of a Madrid based university has developed a technology that allows the control of power inverters for photovoltaic plants grid connection. The research group has a great deal of experience in R&D projects dealing with the modelling and control of electrical machines, mainly for wind energy and photovoltaic applications, and renewable energy grid integration. They are seeking companies in these energy sectors, for a technical cooperation.

Description of the technology

The Power Control Group in a Madrid based Engineering School has expertise in developing new solutions to solve industrial problems related to the control of electrical components and systems in the renewable energy sector.

They are specialists in designing and developing control systems for grid connection of photovoltaic systems. Recently, they have developed an innovative solution of industrial interest for the control of power inverters for photovoltaic plants grid connection. The control system allows for the active and reactive power control of the plant. Maximum power point tracking is achieved by an innovative fuzzy logic control algorithm, and while the output production is maximized, the control system allows for power factor control of the plant, which in the Spanish regulation allows achieving a retribution complement up to 8%. Power factor regulation can be reconfigured into voltage control for the connection to weak grids which has advantages for both the distributor and the photovoltaic plant.

In addition, they are specialists in providing solutions for the control of wind farms with specifications of power-frequency regulation and voltage-reactive power, with the aim of improving the integration of wind energy into the grid. The services they offer in this field, include:

- Designing and developing control systems for variable speed wind energy generators. They have wide and proven experience in developing solutions that allow the connection of electrical energy generated at variable frequency by variable speed wind energy generators to the grid of fixed frequency.
- Designing and developing control systems for electrical drives. They have expertise in field oriented vector control, direct torque control, parameter identification, sensorless control, etc.
- Developing solutions for integration of distributed generation into the grid.

The research group collaborates with companies in the field of generation, transport and distribution of electrical energy, providing integral services of R&D, consulting, assessment, and training. They are members of the Institute of Electrical and Electronics Engineers (IEEE) and participate actively in the activities of the Power Electronics Society.

Innovative aspects

- Their power control systems allow optimizing the production from the wind farms and photovoltaic plants.
- The systems are designed in order to optimize the connection of the electrical energy generated by the aero-generators to the grid.

Competitive advantages

Optimization of the production from the wind farms and photovoltaic plants.

Current state of intellectual property: ☒ Secret know how

Keywords

Universidad
Carlos III de Madrid

Renewable Energies; Power Transmision; Generators, electrical machines and power converters; Photovoltaic; Wind energy**.**

Contact Person: María Dolores García-Plaza
Phone: + 34 91 624 9016 / 9030
E-mail: comercializacion@pcf.uc3m.es