



UNIVERSITY: Public University of Navarre (UPNA)

WIT PROGRAMME'S RESEARCH LINE NAME: Network Integration

DOCTORAL PROGRAMME: Doctorate in Communications Technology, Bioengineering and Renewable Energies <https://www.unavarra.es/escuela-doctorado/doctorate-programs/current-plan/engineering-and-architecture/doctorate-in-communications-technology-bioengineering-and-renewable-energies?languageId=1>

COMPLETE DESCRIPTION OF THE LINE

Having overcome both the technological and economic challenges, renewable energies are currently facing the following challenge which is their large-scale integration into the electricity network. The transition from a centralized electrical system based on large synchronous generators to a distributed one based on electronic converters will entail new problems related to the quality and safety of the electrical supply.

This line of research focuses on the problems derived from the different behavior of electronic converters compared to traditional synchronous generators. After analyzing the functional requirements of the current electrical grid and how these are covered by the synchronous generator, a new model of electrical grid is being studied, where these requirements are covered by the interaction between electronic converters and synchronous generators. This interaction should not affect the stability of the system or the current quality and safety standards. In addition, it is intended to bring new functionalities to the grid by taking advantage of the versatility of these converters.



RESEARCH GROUP NAME: INGEPER, Renewable Energy Grid Integration.

COORDINATOR:

Last and first name; link to the “Portal of scientific production”:

Luis Marroyo Palomo

<https://academicos.unavarra.es/CawDOS/?id=2bee3568a89c3089&idio ma=en&tipo=activ&elmeucv=N>

- Department: Electrical, Electronic and Communication Engineering
- E-mail: luisma@unavarra.es
- Phone: (+34) 948 16 9612

MEMBERS OF THE LINE RESEARCH: Miguel García, Íñigo de la Parra, Javier Marcos, Andoni Urtasun and Luis Marroyo

ANOTHER RESEARCH LINES OF THE GROUP: Power Electronics, Electrical Energy Storage, Energy Conversion in Wind and Photovoltaic Systems.

- Entities involved in research lines and contact person:
 - ✓ Academic:
 - Universidad Pública de Navarra (luisma@unavarra.es)
 - Universidad Politécnica de Madrid (lorenzo@ies-def.upm.es)
 - Universidad Politécnica de Cataluña (francesc.guinjoan@upc.edu)
 - Universidad Rovira i Virgili (hugo.valderrama@urv.cat)
 - ✓ Non academic:
 - Ingeteam Power Technology (roberto.gonzalez@ingetteam.com)



- Siemens Gamesa Renewable Energy
(francisco.jimenez@siemensgamesa.com)
 - Acciona Energía (javier.ruiz.guillen@acciona.com)
 - Nordex – Acciona Windpower (AGarcia3@nordex-online.com)
- Joint supervision of doctoral thesis with international universities or non academic institutions:
 - Behaviour of wind generators with doubly fed asynchronous machine against voltage. Author: Jesús López Taberna. Directors: Luis Marroyo (UPNA, Pamplona), Xabier Roboam (ENSEEIH, Toulouse).
 - Brief group overview

The researchers involved in the project belong to the Research Group on Electrical Engineering, Power Electronics and Renewable Energy (INGEPER). The group has a considerable experience in the generation, distribution and conversion of the electrical energy, paying special attention to grid integration of renewable energies, power electronic converters for energy conditioning, design and operation of hybrid electrical microgrids, and integration of advanced storage technologies with renewable systems. To date, the group has been involved in more than 90 projects, both with public and private funding, the last ones being carried out mainly in co-operation with industrial companies from the sectors of renewable energies, power electronics and electrical storage. The group has published around 200 contributions, including papers in international journals and communications in international conferences and has participated in more than 15 patents.

- Link of the group to the Portal of scientific production:



<https://academicos.unavarra.es/CawDOS/?id=ebcd6eab62b658c6&idioma=en&tipo=actGrupo>

- Photo, links to industrial or academic entities involved (if any)



REQUIRED QUALIFICATIONS: Engineering

For admission to this fellow, it is necessary that the candidate have extensive knowledge in the fields of Power Electronics, Electrical Machines, Automatic Control and Electrical Power Systems.