Short Biography of Dr. Oğuzhan Ceylan

Oğuzhan Ceylan is a faculty member of the Management Information Science Department at Kadir Has University, Istanbul. He has an electrical engineering degree from Istanbul Technical University. His MSc and PhD degrees are from Istanbul Technical University, Informatics Institute. He was a visiting trainee at Digsilent GMBH from 2005 to 2006 through Leonardo Da Vinci Program. He was a postdoctoral researcher at University of Tennessee, Knoxville from 2013 to 2014. From 2014 to 2015 he was a research associate at Oak Ridge National Laboratory. From 2015 to 2017 he was a faculty member of the Electrical and Electronics Engineering Department at Kemerburgaz University, Turkey.

His research interests are mainly concentrated on solving complex optimization problems using either by nature inspired computation techniques or derivative based numerical methods. He is interested in applying solution techniques to mostly power systems based problems. He models the electrical distribution systems and solves the operation, planning related optimization problems that are encountered especially after the integration efforts of the renewable energy sources such as photovoltaics and wind turbines and the new loads such as electrical vehicles. He is also interested in improving the speed of the solutions by applying parallel computing techniques as well.

Dr. Ceylan is a member of IEEE and he is international committees of conferences such as: Universities Power Engineering Conference (UPEC), International Symposium on Industrial Electronics (INDEL), Mediterranean Conference on Power Generation, Transmission, Distribution and Energy Conversion (MEDPOWER), International Conference on Smart Energy Systems and Technologies (SEST) and so on.

Dr. Ceylan was a recipient of Leonardo Da Vinci Scholarship (2005), IEEE CIS (Computational Intelligence Society) Jyvaskyla Summer School Travel Scholarship (2009), Tubitak 2219 Postdoctoral Scholarship (University of Tennessee, Knoxville, 2013), Newton Katip Celebi Travel Scholarship (Brunel University, London, 2015). He organized a UK-Turkish Workshop titled as "Intelligent Infrastructures for Sustainable and Resilient Future Energy Systems" supported by Newton Katip Celebi Fund (Kemerburgaz University, 2017). He also organized a US-Turkish Workshop titled as "Smart Grid and Computational Approaches" supported by Tubitak (Kadir Has University, 2018).

Dr. Ceylan has authored and co-authored several journal and conference papers. His google scholar page can be accessed at: https://scholar.google.com/citations?user=asaGk3cAAAAJ&hl=en

Description of the Research Group

Dr. Ceylan's research group focuses on the applications of both nature inspired optimization methods, and numerical optimization methods to real life problems. More specifically, the problems encountered in power systems are analyzed and solved. The research group concentrates on both operation and planning problems faced in smart grids. The research group more specifically

- Aims to minimize the voltage deviations caused by the recent integration efforts of photovoltaic and wind turbine sources into electrical distribution sources, and thus decrease the power losses by applying both numerical (derivative based methods) methods and meta-heuristic (nature inspired, non-derivative) methods.
- Aims to locate and size new power systems components on electrical grids to efficiently operate the grid in long term.
- Aims to forecast the outputs of the renewable energy sources to improve the efficiency of the operation of the electrical power grids.

The young research group consists of Dr. Ceylan, two MSc and one PhD students right now.

Description of the Work to be carried out by the Student

The student will try to solve the operation problem of the unbalanced distribution systems, by using optimal coordinated operations of capacitors, voltage regulators, and reactive power outputs of the inverters close to renewable energy sources, battery energy storage systems and so on. The aim will be to minimize the voltage deviation, decrease power losses, and solving the problem as fast as possible. The plan of the study is as follows:

- The first phase will be understanding how unbalanced electrical distribution systems can be modelled using tools like OpenDSS and/or GridlabD (combined with Matlab and/or Python).
- The second phase will be understanding the working philosophy of meta-heuristic algorithms and solving optimization test systems using classical meta-heuristic algorithms such as genetic algorithms, particle swarm optimization and/or differential evolution.
- Then, an IEEE Test System will be selected and modified by inclusion of several different renewable energy sources and control devices. A daily simulation will be performed.
- The optimization problem will be modelled on this relatively simpler test system and classical meta-heuristic algorithms will be implemented to solve the optimization problem for each simulated time step.
- Finally, a hybridization of the classical algorithms with some of the newly developed ones such as Moth Flame Algorithm, Whale Optimization Algorithm will be employed to improve the performance.

The student will know to use Matlab and/or Python. It is not expected but it will be better if he/she can use power systems modelling tools such as Matpower, OpenDSS and/or GridlabD.

General Description of the city and the University

Kadir Has University (KHAS), founded in 1997, is one of the leading mid-size universities in Turkey with 6000 undergraduate, 1000 Master's and PhD students and more than 400 researchers. With an exceptional academic staff and a wide range of educational opportunities, as well as high levels of cooperation, interaction, and research capabilities coupled with strong international connections and a dedication to development, KHAS attracts new researchers both from Europe and close region. The Centre of Research for Cyber Security and Critical Infrastructure Protection and Implementation (CCIP), is a vibrant research group of experienced and early-stage researchers from three core disciplines of Engineering and Information Systems, International Relations and Law. KHAS has significant experience in the management and delivery of EU-funded projects (21 successful partnerships and 8 coordinator roles among 49 project applications until now, mostly in Framework Programs).

KHAS also contributes to the vibrancy of Istanbul, supporting the economic, social, and cultural development of its neighborhood as well as promoting concerts, exhibitions, and sports events. KHAS is located on the shores of the Golden Horn on the historical peninsula of Istanbul, which was once the capital city of the Byzantine Empire and the Ottoman Empire. With 15 million inhabitants, the city is a dynamic center for business, finance, science, and the arts in the region, which extends from the Middle East to the Balkans. The city's cosmopolitan character and its vibrant culture are a result of an eclectic mix of East and West, as well as old and new, making Istanbul a great place to study. KHAS is a city university with an award-wining campus. The historical Cibali Tobacco Factory building, which was initially built as a state tobacco depot and cigarette factory in 1884, was later restored and outfitted as the central campus of the university with the latest in infrastructure. The restored building was awarded the prestigious Europa Nostra Award, which is given to the best restoration projects.

While the campus is itself a hub of education and research, its historical museum and exhibition halls provide easy access to the cultural activities that Istanbul offers. Kadir Has University encourages creativity, innovation, and entrepreneurship in all of its academic activities in parallel with its long-term strategies.

Figure 1: Unique location of the University looking at Golden Horn, and modern building