

Graduiertenkolloquium Angewandte Informatik

„Stigmergy-Based Load Scheduling in a Demand Side Management Context”

Fredy Rios (Ingeniero Civil Informático)

AIFB

Abstract:

The share of renewable energy sources (RES) generation is expected to grow dramatically in the following decades. This raises challenges for the power grid stability. Due to the intermittent and uncertain characteristics of these energy sources, it is desirable that they are utilized as they become available. In this context, new intelligent households can provide load flexibility to support demand and supply balancing and increase renewable energy utilization. However, it is vital to manage these flexible loads such that we can prevent herding events while respecting the privacy and autonomy of customers. In this context, it is interesting to observe that the power grid shows features observed in living systems. It is resilient to the failure of single components, as long as they are not essential. Moreover, it has the ability to moderately adapt its generation, to supply energy to large numbers of autonomous customers. Furthermore, it is in permanent evolution, incorporating new technologies, changing its features and limitations.

In this talk, we address the rescheduling of shiftable loads in a sub-section of the power grid (micro-grid) to maximize the utilization of RES. We propose an approach based on stigmergy for efficiently finding a close-to-optimal solution to the general problem. Customers are able to respond to a control signal broadcasted regularly and achieve a coherent behavior from a global perspective in a self-organized manner. The approach is reviewed in on-line and off-line optimization contexts. Furthermore, we present possibilities for adapting the algorithm to other combinatorial optimization problems and provide a comprehensive discussion on the requirements for developing artificial stigmergic systems.

Termin: Mittwoch, 25. November 2015, 15.45 Uhr

Ort: Englerstraße 11, 76131 Karlsruhe
Kollegiengebäude am Ehrenhof (Geb. 11.40), 2. OG, Raum 231
(Hinweise für Besucher: www.aifb.kit.edu/web/Kontakt)

Veranstalter: Institut AIFB, Forschungsgruppe Effiziente Algorithmen

Zu diesem Vortrag lädt das Institut für Angewandte Informatik und Formale Beschreibungsverfahren alle Interessierten herzlich ein.

A. Oberweis, H. Schmeck (Org.), R. Studer, Y. Sure-Vetter