

# Reachability and set-based methods in resource allocation and co-design

Nikolaos Athanasopoulos

## I. ABSTRACT

Set-based methods and in specific reachability analysis offer the appropriate theoretical tools to analyse and control dynamical systems, that may be subject to unwanted phenomena in dynamic networks, such as uncertainties, noise, packet dropouts etc. After briefly introducing the main concepts in reachability analysis of dynamical systems, we will highlight two instances where set-based methods can be successfully applied in edge computing and control over

networks respectively, namely (i) in computation offloading in EC and (ii) analysing the reachability properties of linear systems over faulty networks. Finally, we will attempt to pose several research challenges in these fields under the reachability framework.

N. Athanasopoulos is with the School of Electronics, Electrical Engineering and Computer Science, Queen's University Belfast, Belfast, Northern Ireland. He is supported by the CHIST-ERA 2018 project DRUID-NET "Edge Computing Resource Allocation for Dynamic Networks". E-mail address: [n.athanasopoulos@qub.ac.uk](mailto:n.athanasopoulos@qub.ac.uk)