

SHORT TERM SCIENTIFIC MISSION (STSM) SCIENTIFIC REPORT

This report is submitted for approval by the STSM applicant to the STSM coordinator

Action number: CA15210

STSM title: Stable-matching IP models and recourse in KEPs.

STSM start and end date: 9/12/2018 to 14/12/2018

Grantee name: João Pedro PEDROSO

PURPOSE OF THE STSM:

In this STSM I and my colleagues from INESC TEC planned to have discussions with Dr. Péter Biró and his research group members on the topic of stable exchanges in the kidney exchange problem, as well as on models that consider failures in the implementation of planned transplants.

As for stable exchanges in the kidney exchange problem, discussions on this subject started at the visit of Dr. Péter Biró to INESC TEC, Porto, in 2017; later on, we found it necessary to validate the models discussed and extend them to the case of ties in the ranking score.

Concerning failures in the implementation of planned transplants, we believe that research in this line is very important for dealing with transnational collaboration. In particular, it is important to have the least possible failures in exchanges involving different countries; we have been discussing on this topic with Dr. Péter Biró since several years ago, and identified potential for collaborating which we wanted to exploit.

DESCRIPTION OF WORK CARRIED OUT DURING THE STSMS

We discussed with Dr. Péter Biró how to pursue work on stable exchanges in the kidney exchange problem, in particular on the extension and validation of integer optimization models to solve the problem, and on how to complement preliminary results that have been presented in a conference. We have now planned further joint work on the extension of models to the case of allowing ties in ranking preferences, i.e., the case of patients for which several donors could provide a transplant of similar quality. This is being studied under mathematical optimization formulations that provide stable and strongly stable matchings, which were extended during this visit, and for which we have planned submitting a paper for publication in a scientific journal.

We discussed failure in KEP's, a subject for which there was a presentation by a student of Dr. Biró, and considered possibilities for collaborating in this topic.

Finally, we discussed issues on the joint management of the KEP and the deceased donors waiting lists.

DESCRIPTION OF THE MAIN RESULTS OBTAINED

The main results of this visit were:

1. Completing a mathematical optimization model for finding maximal stable matchings in a KEP, considering both strict preferences and ties;
2. Defining how to validate these models;
3. Discussing on possible research collaboration for addressing failure in KEPs.

FUTURE COLLABORATIONS (if applicable)

Márton Gyetvai, a PhD student at Corvinus University, planned to visit INESC TEC in 2019 for joint research on the topic of this Action.