Polyhedral Omega Genelliştirmeleri Ve Uygulamaları
Polyhedral Omega: Generalizations and Applications

The project "Polyhedral Omega: Generalizations and Applications - POGA" is funded under the 1001 Program of TÜBITAK.

Project Description

POGA is about solving problems that are described by linear Diophantine systems (LDS). We seek for rational generating functions that enumerate the solutions of LDS.

There are two types of such problems we deal with in POGA:

- Computing all solutions to a linear Diophantine system (LDS),
- Computing the optimal solution with respect to some linear function (objective function).

The first type of problems is very important in number theory and combinatorics, where computing the generating function of some objects with properties described by linear constraints is common. The second type of problems is ubiquitous in applications, since a lot of real world problems are modeled as Integer Linear Programs (ILP).

In POGA we generalize Polyhedral Omega, a method for solving linear Diophantine systems, in order to find the generating function for a family of problems parametrized by their dimension on one hand, and we show how to use it for solving ILP on the other.

Position Description

The project starts on **October 15, 2022**. For the duration of 3 years, there will be 2 positions for master's students and one post-doc position available.

For the first phase of the project (Oct 2022-Oct 2023), we are looking for researchers with a background in any of the following:

- Polyhedral Geometry
- Rewriting techniques
- Logic

Applicants must be comfortable with writing code in C/C++, Python or JuliaLang.
The researchers will have office space in the ALCYON lab at Gebze Technical University.
Note that applicants for the post-doc position must hold a PhD.

Application

The deadline for applications for the first period of the project is October 10, 2022. To apply, fill in this form `https://tinyurl.com/applypoga`.
For questions, please contact `zafeirakopoulos@gmail.com`.