# Joint User Selection and Receiver Combiner

# Design in Asymmetric Cell-Free Networks

This repository contains Matlab codes for the submitted paper on joint design of user selection and receiver combiner in asymmetric cell-free networks (ACFNs).

# Abstract

In this work, we propose joint sparse solver known as sparse and group sparse least absolute shrinkage and selection operator (JSGSL LASSO, shortly JSGSL) for the uplink communications in ACFNs. JSGSL solution is shown to achieve higher selection accuracy and higher sum-rate compared to the state-of-the-art minimum mean-square error (MMSE) combiner with random selection. We also show that JSGSL can be harnessed with MMSE to reap high selection accuracy of sparse solvers and high data rate performance of MMSE combiners at the cost of increased complexity.

# Contents of the Repository

This repository contains two folders. In the Generator folder, random variables are created and logged. In the code\_01 folder, JSGSL algorithm for the joint design of user selection and receiver combiner is provided.

# Introduction

Place the folders Generator and code\_01 under the same folder. Then execute Runners\_v03\_01.m. The working principle of the codes is almost same with an earlier work explained on [YouTube](https://www.youtube.com/watch?v=tArW7X8EYIw&t=31s). However, another YouTube video tailored for this work will be uploaded soon.

# Simulation Environment

For the simulations,

HW: Windows 10 laptop PC is used.

SW: Matlab R2022a is used. For the input and outputs of the algorithms Microsoft Excel is recommended.