

# Codebook generator, generation method, control method and program

## Possible to control IRS without CSI

### Overview

IRS (Intelligent Reflecting Surface) is known as a means to improve network performance. IRS is a device with integrated metamaterial element. Electromagnetic wave incident on the device can be reflected in any direction by controlling metamaterial element. Normally, CSI (Channel State Information) is required to control IRS. However, IRS is a passive device and cannot send nor receive information. Therefore, a device to collect CSI must be installed separately from IRS and connected to IRS, which requires cost and technical burden.

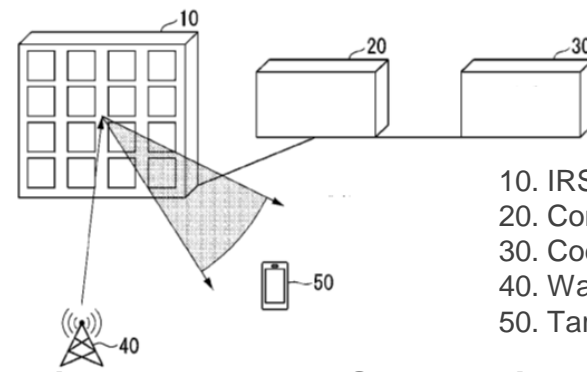
This invention is able to provide a controller that can control IRS without the need of CSI. This invention has a control pattern selection unit that determines a control pattern corresponding to representative value that is in the same cluster as reference value based on reflection target and codebook that show correspondence between representative value and IRS control pattern, and a control unit that controls IRS based on pattern. The codebook classifies reference value into cluster, generates representative value in each cluster, and generates control pattern corresponding to the representative value.

### Product Application

- 6G next generation communication standard
- Network communication

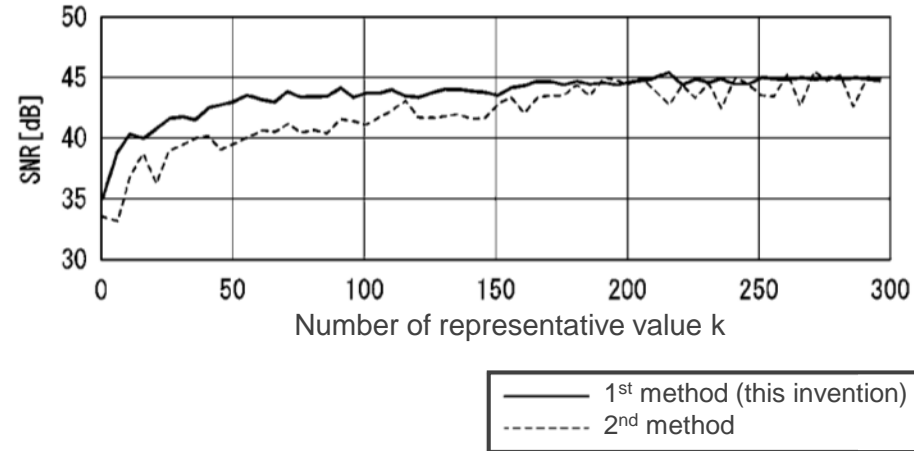
### IP Data

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- 10. IRS
- 20. Control device
- 30. Codebook generator
- 40. Wave source
- 50. Target

## Possible to control IRS depending on reference value, and to control IRS without CSI



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