Tracing Path Gain to Measure Signal Strength from Diffraction

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# Introduction

With the rise of wireless communication systems, attention must be given to

# Formulation

## To investigate the path gain along a two-dimensional (2D) street cross-section, a model must be defined. This model will account for an intersection. Because only diffraction is accounted for, only the corners of the intersection are necessary in the model.

Chart, line chart

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Fig. 1

An omnidirectional transmitter is placed at the origin in Fig. 1. For the sake of wireless systems, the path gain gives crucial insight to the necessary signal from the transmitter. A possible lossy scenario can diminish the signal heavily. To investigate the path gain on the street with respect to distance, a line 500 m in length is stretched in two perpendicular directions, each line parallel to the walls of the street. Line AB is 20 m north of the green wall and Line CD is 30 m west of the purple and green walls depicted in Fig. 1.

To determine the path gain, the received fields from three sources must be considered: the incident field and the diffracted fields from the two corners. The incident field is given as

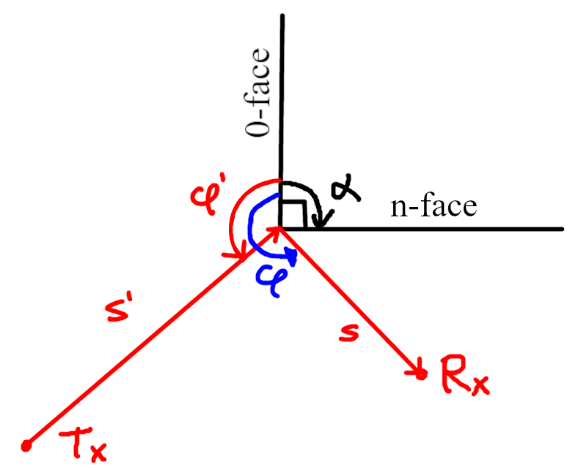
*ei(r) = e-jβr/r* (1)

where *r* is the distance from the transmitter to the receiver. The *β* represents

*β= 2πf/c* (2)

as *f* is the frequency of the transmitted field and *c* is the speed of light.

The diffracted field



the received signal from the transmitter is calculated by accounting for the direct field

## Equations

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# Conclusion

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