# Notes on the Theory of Super-Resolution

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## Introduction

### Uncertainty Principles and Signal Recovery

Uncertainty Principle:

if a function is zero everywhere outside of interval of length and its Fourier transform is zero outside of interval of length then

(1)

A more general principle utilizing measure set theory holds:

Measure Set Uncertainty Principle:

If a function is zero almost everywhere outside of a measurable set and is zero almost everywhere outside a measurable set , then

(2)

where and denote the measures of the sets T and W, and

## References

[Decoding by Linear Programming, Emmanuel Candes, Terence Tao, Caltech, 2004](https://github.com/dimitarpg13/spectral_analysis/blob/main/literature/articles/compressed_sensing/DecodingByLinearProgrammingCandes2005.pdf)

[Robust Uncertainty Principles: Exact Signal Reconstruction from Highly Incomplete Frequency Information, Emmanuel Candes, Justin Romberg, Terence Tao, 2005](https://github.com/dimitarpg13/spectral_analysis/blob/main/literature/articles/compressed_sensing/RobustUncertaintyPrinciplesCandes2005.pdf)

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