Your Paper

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Abstract

Your abstract.

1 Introduction

Discussion on results for week 2, section 1

We used one signal generator (N9310A) with a wide range of allowed frequencies, while the other (83712B) with a lower frequency limit of 10 MHz.

We set the 83712B to run at 11 MHz and 1.5 dBm (justify??). This gave $\Delta\nu = .05 \times \nu_{LO} = .55$ MHz. We set the N9310A to run at 1.5 dBm as well and, depending on the trial, either $\nu_{RF} = \nu_{LO} + \Delta\nu = 11.55$ MHz or $\nu_{RF} = \nu_{LO} - \Delta\nu = 10.45$ MHz.

When collecting data, we sampled at 32.5 MHz, which is more than double the Nyquist frequency. ?? why is this important and give a calculation of how far above the Nyquist this is

?? I didn't identify the sum and difference frequencies from observation!!
$\sin(\nu_{LO} + \Delta\nu) = \sin\nu_{LO}\cos\Delta\nu + \cos\nu_{LO}\sin\Delta\nu$
$\sin(\nu_{LO} - \Delta\nu) = \sin\nu_{LO}\cos\Delta\nu - \cos\nu_{LO}\sin\Delta\nu$
But these are not relevant, we want
$sin(a) + sin(a + b) =$?, right?
$\sin(\nu_{LO})\sin(\nu_{LO} + \Delta\nu) = \frac{1}{2}(\cos\Delta\nu - \cos(2\nu_{LO} + \Delta\nu))$ by evenness of the cosine function
and
$\sin(\nu_{LO})\sin(\nu_{LO} - \Delta\nu) = \frac{1}{2}(\cos\Delta\nu - \cos(2\nu_{LO} - \Delta\nu))$
Why do the power spectra look the way they do. Upper sideband and lower sideband.

For the upper sideband, we can see spikes at almost the difference frequency (.575 MHz $\approx$ .55 MHz). The other spikes are at 10.2 MHz? Why?

For the lower sideband, we see outer spikes at 9 MHz. The inner spikes are still at roughly the difference frequency...

First I need indices of maxima?
Recreate the original using Fourier filtering. I did NOT do this!!
Explain what you see.

2 Some examples to get started

2.1 How to include Figures

First you have to upload the image file from your computer using the upload link the project menu. Then use the includegraphics command to include it in your document. Use the figure environment and the caption command to add a number and a caption to your figure. See the code for Figure 1 in this section for an example.

2.2 How to add Comments

Comments can be added to your project by clicking on the comment icon in the toolbar above. To reply to a comment, simply click the reply button in the lower right corner of the comment, and you can close them when you're done.

Comments can also be added to the margins of the compiled PDF using the todo command,

Here's a comment in the margin!

Figure 1: This frog was uploaded via the project menu.

Item	Quantity
Widgets	42
Gadgets	13

Table 1: An example table.

as shown in the example on the right. You can also add inline comments:

This is an inline comment.

2.3 How to add Tables

Use the table and tabular commands for basic tables — see Table 1, for example.

2.4 How to write Mathematics

LaTeX is great at typesetting mathematics. Let $X_1, X_2, \ldots, X_n$ be a sequence of independent and identically distributed random variables with $\mathrm{E}[X_i] = \mu$ and $\mathrm{Var}[X_i] = \sigma^2 < \infty$, and let

$$S_n = \frac{X_1 + X_2 + \cdots + X_n}{n} = \frac{1}{n}\sum_{i}^{n} X_i$$

denote their mean. Then as n approaches infinity, the random variables $\sqrt{n}(S_n - \mu)$ converge in distribution to a normal $\mathcal{N}(0, \sigma^2)$.

2.5 How to create Sections and Subsections

Use section and subsections to organize your document. Simply use the section and subsection buttons in the toolbar to create them, and we'll handle all the formatting and numbering automatically.

2.6 How to add Lists

You can make lists with automatic numbering ...

1. Like this,
2. and like this.

... or bullet points ...

- Like this,
- and like this.

2.7 How to add Citations and a References List

You can upload a `.bib` file containing your BibTeX entries, created with JabRef; or import your Mendeley, CiteULike or Zotero library as a `.bib` file. You can then cite entries from it, like this: [Gre93]. Just remember to specify a bibliography style, as well as the filename of the `.bib`.

You can find a video tutorial here to learn more about BibTeX.

We hope you find Overleaf useful, and please let us know if you have any feedback using the help menu above — or use the contact form at `https://www.overleaf.com/contact`!

References

[Gre93] George D. Greenwade. The Comprehensive Tex Archive Network (CTAN). *TUGBoat*, 14(3):342–351, 1993.