Communication Systems Toolkit – Work in Progress

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Summary of Changes

Having been in development for some time, the last report on Communication Systems Toolkit was in 2005[1]. Since then, the toolkit has been used unchanged for demonstration purposes in different offerings of ELE 402, Communications Engineering at Geneva College. At the beginning of Fall '15 semester, the Toolkit was made up of a conglomeration of programs (VIs) categorized under headings of chapters of a previous textbook used in the course. They were reorganized by topics independent of any textbook. The new organization system makes the Toolkit easier to navigate through for students or other instructors.

The heart of the Toolkit is a signal generator which produces message signals to be used under different modulation techniques. Our first task was to update signal generator to take advantage of extra memory space recent computers have acquired. In the past, we had limited the sampling frequency to 128 samples per second but now, the user can specify the sampling frequency without any limitations. This new freedom has allowed us to go up to 4.5 MHz for our sampling frequency, enabling us to use much more realistic modulation frequency to baseband frequency ratios. As a result, AM and AM demodulation demonstrations, which employ lowpass filters, have improved for square and triangular message waveforms.

In the Spring semester, we intend to add new exercises to showcase the capabilities of improved simulations. We will also add a help file library that can be accessed within LabVIEW. We intend to test the toolkit on the Communication Systems Laboratory computers to document the highest sampling frequency that can be specified in their current configuration.

Bibliography

1. "Simulation of a Proposed Technique of Envelope Detection with a LabVIEW Based Communication Systems Toolkit", A. Wright, M. Tanyel, Proceedings of 2005 ASEE North Central Section Meeting, Lima, OH, April 7-8 2005