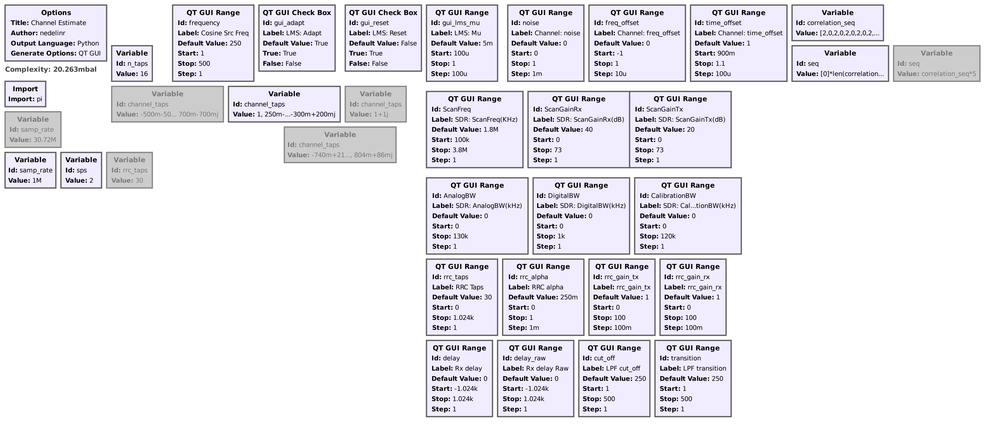
Options
Title: Channel Estimate
Author: nedelinr
Output Language: Python
Generate Options: QT GUI
Complexity: 20.263mbal
QT GUI Range
Id: frequency
Label: Cosine Src Freq
Default Value: 250
Start: 1
Stop: 500
Step: 1
QT GUI Check Box
Id: gui_adapt
Label: LMS: Adapt
Default Value: True
True: True
False: False
QT GUI Check Box
Id: gui_reset
Label: LMS: Reset
Default Value: False
True: True
False: False
QT GUI Range
Id: gui_lms_mu
Label: LMS: Mu
Default Value: 5m
Start: 100u
Stop: 1
Step: 100u
QT GUI Range
Id: noise
Label: Channel: noise
Default Value: 0
Start: 0
Stop: 1
Step: 1m
QT GUI Range
Id: freq_offset
Label: Channel: freq_offset
Default Value: 0
Start: -1
Stop: 1
Step: 10u
QT GUI Range
Id: time_offset
Label: Channel: time_offset
Default Value: 1
Start: 900m
Stop: 1.1
Step: 100u
Variable
Id: correlation_seq
Value: [2,0,2,0,2,0,2,0,2,...
Variable
Id: n_taps
Value: 16
Variable
Id: seq
Value: [0]*len(correlation...
Variable
Id: seq
Value: correlation_seq*5
Import
Import: pi
Variable
Id: channel_taps
Value: -500m-50... 700m-700mj
Variable
Id: channel_taps
Value: 1, 250m-...-300m+200mj
Variable
Id: channel_taps
Value: 1+1j
Variable
Id: samp_rate
Value: 30.72M
Variable
Id: channel_taps
Value: -740m+21..., 804m+86mj
QT GUI Range
Id: ScanFreq
Label: SDR: ScanFreq(KHz)
Default Value: 1.8M
Start: 100k
Stop: 3.8M
Step: 1
QT GUI Range
Id: ScanGainRx
Label: SDR: ScanGainRx(dB)
Default Value: 40
Start: 0
Stop: 73
Step: 1
QT GUI Range
Id: ScanGainTx
Label: SDR: ScanGainTx(dB)
Default Value: 20
Start: 0
Stop: 73
Step: 1
Variable
Id: samp_rate
Value: 1M
Variable
Id: sps
Value: 2
Variable
Id: rrc_taps
Value: 30
QT GUI Range
Id: AnalogBW
Label: SDR: AnalogBW(kHz)
Default Value: 0
Start: 0
Stop: 130k
Step: 1
QT GUI Range
Id: DigitalBW
Label: SDR: DigitalBW(kHz)
Default Value: 0
Start: 0
Stop: 1k
Step: 1
QT GUI Range
Id: CalibrationBW
Label: SDR: Cal...tionBW(kHz)
Default Value: 0
Start: 0
Stop: 120k
Step: 1
QT GUI Range
Id: rrc_taps
Label: RRC Taps
Default Value: 30
Start: 0
Stop: 1.024k
Step: 1
QT GUI Range
Id: rrc_alpha
Label: RRC alpha
Default Value: 250m
Start: 0
Stop: 1
Step: 1m
QT GUI Range
Id: rrc_gain_tx
Label: rrc_gain_tx
Default Value: 1
Start: 0
Stop: 100
Step: 100m
QT GUI Range
Id: rrc_gain_rx
Label: rrc_gain_rx
Default Value: 1
Start: 0
Stop: 100
Step: 100m
QT GUI Range
Id: delay
Label: Rx delay
Default Value: 0
Start: -1.024k
Stop: 1.024k
Step: 1
QT GUI Range
Id: delay_raw
Label: Rx delay Raw
Default Value: 0
Start: -1.024k
Stop: 1.024k
Step: 1
QT GUI Range
Id: cut_off
Label: LPF cut_off
Default Value: 250
Start: 1
Stop: 500
Step: 1
QT GUI Range
Id: transition
Label: LPF transition
Default Value: 250
Start: 1
Stop: 500
Step: 1
Note
Note: Input data, before Tx
Vector Source
Vector: seq
Tags:
Repeat: Yes
Virtual Sink
Stream ID: Reference
Virtual Sink
Stream ID: Data_to_Tx
Signal Source
Sample Rate: 1M
Waveform: analog.GR_COS_WAVE
Frequency: 250k
Amplitude: 1
Offset: 0
Initial Phase (Radians): 0
cmd
freq
Constant Source
Constant: 1
Magnitude and Phase To Complex
mag
phase
Multiply Const
Constant: 3.1415
DC Blocker
Length: 32
Long Form: True
Int To Float
Scale: 1
Random Source
Minimum: 0
Maximum: 2
Num Samples: 1k
Repeat: Yes
LimeSDR Sink (TX)
RF frequency: 1.8G
Sample rate: 1M
Oversample: Default
Note
Note: Radio channel - Tx
Virtual Source
Stream ID: Data_to_Tx
Throttle
Sample Rate: 1M
Channel Model
Noise Voltage: 0
Frequency Offset: 0
Epsilon: 1
Taps: 1, 250m-... -300m+200mj
Seed: 0
Block Tag Propagation: No
Virtual Sink
Stream ID: TxData
Note
Note: Radio channel - Rx
LimeSDR Source (RX)
RF frequency: 1.8G
Sample rate: 1M
Oversample: Default
MIMO phase align: Disabled
Virtual Sink
Stream ID: RxData
Virtual Source
Stream ID: TxData
Virtual Sink
Stream ID: RxDataRaw
Note
Note: Radio channel - Tx RRC
Virtual Source
Stream ID: Data_to_Tx
Root Raised Cosine Filter
Decimation: 1
Gain: 1
Sample Rate: 1M
Symbol Rate: 500k
Alpha: 250m
Num Taps: 30
Virtual Sink
Stream ID: Reference
LimeSDR Sink (TX)
RF frequency: 1.8G
Sample rate: 1M
Oversample: Default
Throttle
Sample Rate: 1M
Channel Model
Noise Voltage: 0
Frequency Offset: 0
Epsilon: 1
Taps: 1, 250m-... -300m+200mj
Seed: 0
Block Tag Propagation: No
Virtual Sink
Stream ID: TxData
Note
Note: Radio channel - Rx RRC
LimeSDR Source (RX)
RF frequency: 1.8G
Sample rate: 1M
Oversample: Default
MIMO phase align: Disabled
Virtual Source
Stream ID: TxData
Root Raised Cosine Filter
Decimation: 1
Gain: 1
Sample Rate: 1M
Symbol Rate: 500k
Alpha: 250m
Num Taps: 30
DC Blocker
Length: 32
Long Form: True
Low Pass Filter
Decimation: 1
Gain: 1
Sample Rate: 1M
Cutoff Freq: 250k
Transition Width: 250k
Window: Hamming
Beta: 6.76
Virtual Sink
Stream ID: RxData
Virtual Sink
Stream ID: RxDataRaw
Note
Note: Spectrum display
Virtual Source
Stream ID: Reference
Virtual Source
Stream ID: RxData
Virtual Source
Stream ID: RxDataRaw
QT GUI Frequency Sink
Name: Spectrum
FFT Size: 1.536k
Center Frequency (Hz): 1.8M
Bandwidth (Hz): 500k
freq
bw
Note
Note: Adaptive filter Raw
Virtual Source
Stream ID: Reference
Virtual Source
Stream ID: RxDataRaw
Delay
Delay: 0
LMS Filter
First Input: Reference
Num. Taps: 16
μ: 5m
Skip: 0
Decimation: 1
Adapt: True
Bypass: False
Reset: False
reference
input
filtered_input
output
error
taps
Virtual Sink
Stream ID: LMS_Fixed_Raw
Virtual Sink
Stream ID: LMS_Error_Raw
Complex To Float
Vec Length: 16
QT GUI Vector Sink
Name: LMS Taps Raw
Vector Size: 16
X-Axis Start Value: 0
X-Axis Step Value: 1
X-Axis Units:
Y-Axis Units:
Ref Level: 0
Note
Note: Adaptive filter
Virtual Source
Stream ID: Reference
Virtual Source
Stream ID: RxData
Delay
Delay: 0
LMS Filter
First Input: Reference
Num. Taps: 16
μ: 5m
Skip: 0
Decimation: 1
Adapt: True
Bypass: False
Reset: False
Virtual Sink
Stream ID: LMS_Fixed
Virtual Sink
Stream ID: LMS_Error
Complex To Float
Vec Length: 16
QT GUI Vector Sink
Name: LMS Taps
Vector Size: 16
X-Axis Start Value: 0
X-Axis Step Value: 1
X-Axis Units:
Y-Axis Units:
Ref Level: 0
Note
Note: Display ...with offsets
Virtual Source
Stream ID: Reference
Virtual Source
Stream ID: RxData
Virtual Source
Stream ID: LMS_Fixed
Virtual Source
Stream ID: LMS_Error
Add Const
Constant: 11+11j
Add Const
Constant: 5+5j
Add Const
Constant: -1-1j
Add Const
Constant: -7-7j
QT GUI Time Sink
Name: Data Compare
Number of Points: 1.536k
Sample Rate: 1M
Autoscale: No
Virtual Source
Stream ID: Reference
Virtual Source
Stream ID: RxDataRaw
Virtual Source
Stream ID: LMS_Fixed_Raw
Virtual Source
Stream ID: LMS_Error_Raw
Add Const
Constant: 11+11j
Add Const
Constant: 5+5j
Add Const
Constant: -1-1j
Add Const
Constant: -7-7j
QT GUI Time Sink
Name: Data Compare Raw
Number of Points: 1.536k
Sample Rate: 1M
Autoscale: No
Note
Note: Correlation comparison
Virtual Source
Stream ID: Reference
Virtual Source
Stream ID: LMS_Fixed_Raw
Virtual Source
Stream ID: LMS_Fixed
Virtual Source
Stream ID: RxData
Correlation Estimator
Symbols: correlation_seq
Samples per Symbol: 2
Tag marking delay: 0
Threshold: 900m
Threshold Method: Absolute
Null Sink
Add Const
Constant: 1k+1kj
Add Const
Constant: 0
Add Const
Constant: -1k-1kj
Add Const
Constant: -2k-2kj
QT GUI Time Sink
Name: Correlation
Number of Points: 4.608k
Sample Rate: 1M
Autoscale: No