TutorTIMS
CLOUD

EXPERIMENTS IN
MODERN COMMUNICATIONS

EMONA TutorTIMS-Cloud
Simulation Software

DESIGNED SPECIFICALLY FOR LABORATORY TEACHING

Communications Courses | Signals & Systems Courses

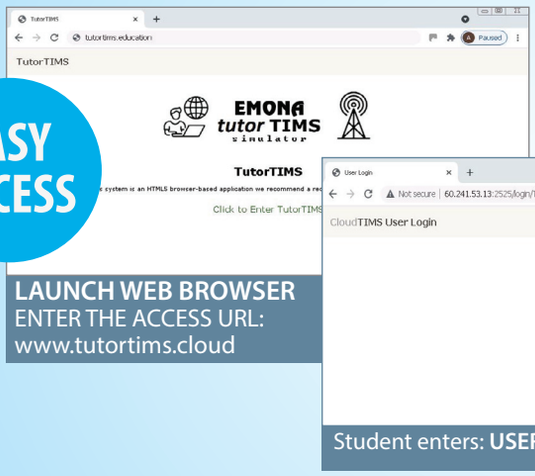
EMONA INSTRUMENTS

www.emona-tims.com

FAST, SIMPLE, EASY ACCESS for STUDENTS

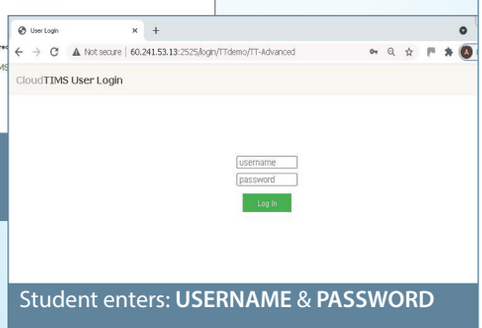
Simple to Launch - no downloads and no files to install

Direct Web Browser Access

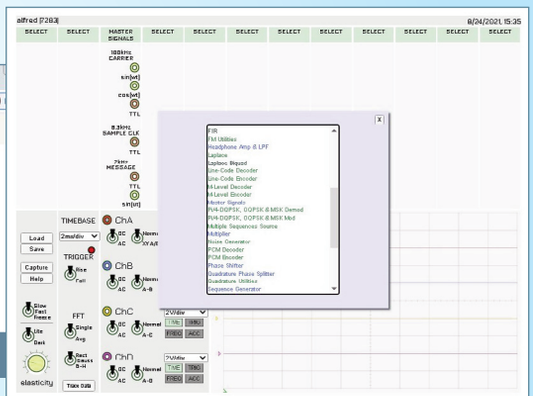


EASY ACCESS

LAUNCH WEB BROWSER
ENTER THE ACCESS URL:
www.tutortims.cloud



Student enters: **USERNAME** & **PASSWORD**



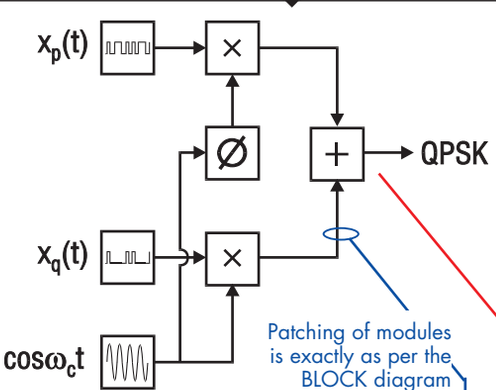
Tutortims-cloud program instantly launches in the student's web browser. Click to pick-and-place modules and start building experiments.

EASY TO UNDERSTAND BLOCK DIAGRAM APPROACH
No Programming or syntax required to build experiments

$$x_p(t).\cos\omega_c t + x_q(t).\sin\omega_c t = QPSK$$

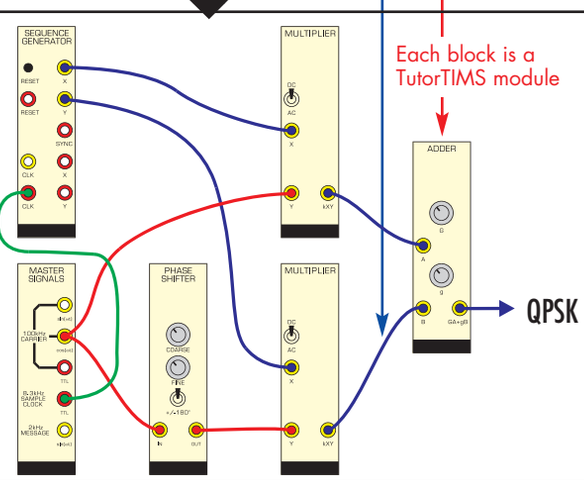
START WITH MATH OR THEORY

Telecommunications text books are a source of equations and theories.



REPRESENT IT AS A BLOCK DIAGRAM

In telecommunications, Math and Theory is always expressed in the universal language of BLOCK DIAGRAMS.



BUILD IT USING TutorTIMS MODULES

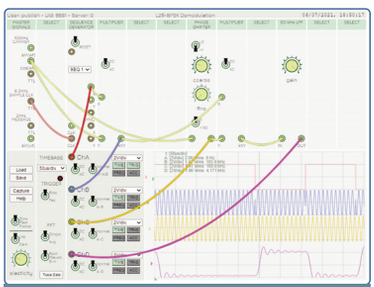
TIMS & TutorTIMS both realise telecommunications BLOCK DIAGRAMS for students to build experiments.

STUDENTS BUILD EXPERIMENTS BY:

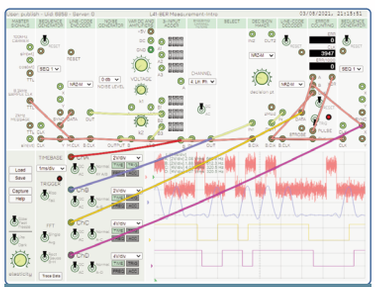
1. CLICKING AND SELECTING FROM A MENU OF **50+ MODULES** and
2. CONNECTING INPUTS TO OUTPUTS to build modulation or coding experiments.

TutorTIMS-Cloud Wide Range of Experiments
Analog Mod, Digital Mod, Signals & Systems

EXAMPLE SCREENSHOTS

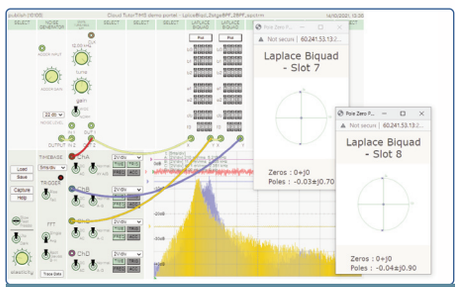


BPSK modulation & demod

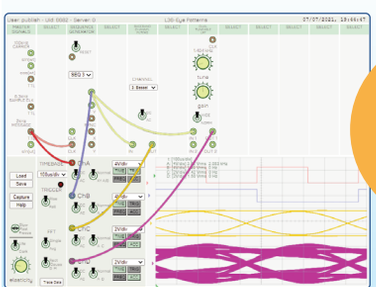


BER in a noisy passband channel

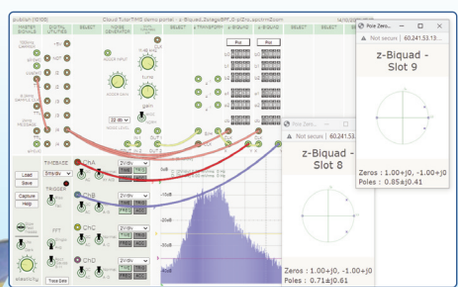
SIGNALS & SYSTEMS - dynamic and visual



Laplace biquad 2 stage BPF
with **dynamic** pole zero plots



Eye patterns



z-Transform biquad 2 stage BPF
with **dynamic** pole zero plots in the z-plane

EASY ACCESS TO ALL TutorTIMS FUNCTIONS

TutorTIMS-Cloud is uniquely easy for students to use. All TutorTIMS-Cloud functions are directly accessible at the front panel display. There are no menu structures and there is no syntax to learn. On-screen HELP available via the front panel switch. No programming is required to build TutorTIMS Telecommunications experiments.

Hardware-like toggle switches & potentiometer knobs

On-screenHELP and MANUALS

LOAD and SAVE experiments, with all connections and settings

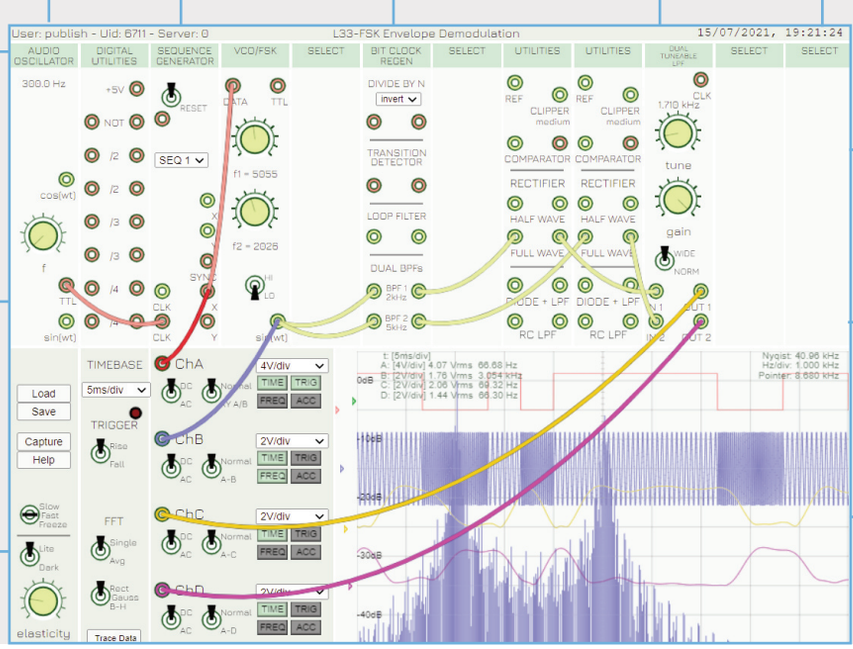
Secure screen CAPTURE used for student assesment

Over 50 fundamental building blocks: starting with basic ADDER, MULTIPLIER and OSCILLATOR

"Signals & Systems" modules include:
- LAPLACE and
- z-TRANSFORM

Insert and remove modules with a simple RIGHT mouse click

"Expert"modules include:
- 8 stage FIR module;
- LAPLACE BIQUAD module;
- z-BIQUAD module
- WIDEBAND OSCILLATOR module



"Expert"modules include:
- 8 stage FIR module;
- LAPLACE BIQUAD module;
- z-BIQUAD module
- WIDEBAND OSCILLATOR module

Scope, XY, accumulate and FFT (spectrum) display of both channels

Scope and FFT with Rectangular, Gaussian and Blackman-Harris Window functions

Click & drag cursor measurements

TutorTIMS-Cloud User Licence Options

- **TutorTIMS-Cloud Advanced with Expert Signals & Systems** (52 modules) : 5, 15, 30 and 250 user licenses
- **TutorTIMS-Cloud Basic with Signals & Systems** (18 basic and 8 signals & systems modules) : 250 user license
- **TutorTIMS-Cloud Basic** (18 basic modules) : 250 user license
  (See TutorTIMS-Cloud Basic experiments listed below with experiments marked as *)

TutorTIMS-Cloud Experiment List

Modulation & Coding Experiments:

L-01* Introduction to TIMS modules
L-02* Modelling equations
L-03* DSBSC - generation
L-04* Product demodulation
L-05* AM - amplitude modulation - I
L-06* AM - amplitude modulation - II
L-07* Envelope detection
L-08* SSB generation
L-09* SSB demodulation
L-10 ISB - independent sideband
L-11* Armstrong`s phase modulator
L-12* FM - generation by VCO
L-13 FM - demodulation by PLL
L-14* FM - demodulation by ZX counting
L-15* Sampling
L-16 PAM and TDM
L-17* FDM - frequency division multiplex
L-18* Phase division multiplex - generate
L-19* Phase division multiplex - demod
L-20* PWM - pulse width modulation
L-21* Carrier acquisition - PLL
L-23* Complex analog messages
L-24 PCM - encoding
L-25 PCM - decoding
L-26* ASK - generation
L-27 ASK - demodulation
L-28* BPSK - modulation
L-29* BPSK - demodulation
L-30* QPSK - generation -
L-31* QPSK - demodulation
L-32* FSK - generation
L-33 FSK - envelope demodulation
L-34 Signal constellations
L-35 DSSS - spread spectrum
L-36* Eye patterns - intro
L-37 PRBS messages
L-38 Detection with the DECISION MAKER
L-39 The noisy channel
L-40 BER instrumentation
L-41 BER measurement - introduction
L-42 Line coding & decoding
L-43 Delta modulation
L-44 Delta-sigma modulation
L-45 Adaptive delta modulation
L-46 Delta demodulation
L-47 Bit clock regeneration
L-48* QAM - generation
L-49* QAM - demodulation
L-50 DPSK
L-53 Multi-channel fiber - no fiber
L-54 PCM-TDM 'T1' - no fiber
L-55 DPSK & BER
L-56 Bit clock regen in a T1 PCM-TDM
L-57 DPSK and carrier acquisition
L-60 Matched filter detection
L-62 CDMA - introduction
L-63 CDMA - processing gain
L-64 CDMA - 2 channel
L-65 CDMA multichannel (4-ch tx,1 rx)
L-67 CDMA at carrier frequencies
L-68* non-linearity & distortion
L-69 PPM - pulse position modulation
L-70 speech in telecommunications
L72-Multilevel Data
L73-Voiceband Modem
L74-Voiceband Modem-Demod
L76-System Fault Finding
L-77 Frequency synthesis with the PLL
L-78 block code encoding (method 1)
L-80 block code decoding
L-82 superheterodyne - (two channels)
L-84 FM deviation multiplication
L-85 FM and Bessel zeros
L-103 Introduction to OFDM Generation
L-104* Introductory PAM-TDM
L-105* QASK
L-106* Introduction to pulse shaping
L-107* Noise gen using binary sequ
L-108* Principles of spread spectrum
L-113 SNR - SSB compared with DSBSC
L-114 AM demodulation and SNR
L-115 4/8/16-QAM & QPSK with BER
L-144 BER in coherent BFSK - ideal ch

D2-11 PPM & PWM
D2-12b QAM and 4-PSKD2-
13 Multi-level QAM/PSK
D3-01 ISI: PAM & ASK - bl channels
D3-02 equalization for ISI
D3-03 ISI: pulse shaping for bl channel
D3-04 baseline wander & line coding
D3-05 timing jitter in b'lim systems
D3-13 the SONET PCM data frame
D3-14 SONET STS-1 demultiplexing
D3-18 GFSK - Gaussian FSK

D4-01 BER measurement of unipolar NRZ signals in a baseband distortionless chan.
D4-02 BER measurements of bipolar NRZ signals in a baseband distortionless chan.
D4-03 BER measurement of coherent BPSK signalling in an ideal distortionless channel
D4-04 MSK in a passband channel, with BER vs SNR
D4-05 OQPSK in a passband channel, with BER vs SNR
D4-06 PI/4-DQPSK, PI/4-QPSK, OQPSK & MSK: spectra and constellations-
D7-01 BER measurement of Noncoherent BFSK in an ideal distortionless channel
D7-02 BER measurement of Coherent BFSK in an ideal distortionless channel
D7-03 BER measurement of DBPSK in an ideal distortionless channel

Signals & Systems Experiments:

Special signals – characteristics and app's
Modeling linear and nonlinear systems
Unraveling convolution
Comparing responses in the time and frequency domains
A Fourier series analyzer
Spectrum analysis of various signal types
Getting started with poles and zeros in the Laplace domain
Sampling and aliasing
Getting started with analog-digital conversion
Discrete-time filters - Finite Impulse Resp.
Using poles and zeros in the z plane: Discrete-time filters
Discrete-time filters - practical applications

EXPERT-z_biquad:

z-biquadDemo-1
z-Biquad_Demo_1-stage
z-Biquad_Demo_2-stage
EXPERT-laplace_biquad:
Laplace-biquad
LplceBiqd_1-stgeLPF_spctrmNoise
LplceBiqd_1-stgeLPF_timeDom

EXPERT-FIR:

FIR16_HPF_pulsResp_8ksamp
FIR16_inputNoiseSpect_sampled25k
FIR16_LPF_pulsResp_8ksamp
FIRdemos-1

E&OE Specifications subject to change without notice

* indicates TutorTIMS-Cloud Basic experiment capabilities

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