ASN Filter Designer: release notes (Versions 5,4,3,2)

V5.2.2 (31 March 2023) – what's changed

Signal analyser

- Extended external datafile limit to 200,000 points.
- Improved Data Import Wizard UI layout and help
- Added drag and drop functionality to both external data files and audio files
- Data analysis: Savitzky-Golay derivative filter export – added export options to C#, C, Matlab and Python.
- Data analysis: Improved the Difference peak/troughs method
- DC Frequency analysis: adjusted CZT gain at DC to match DFT result.
- NL functions: fixed library issue with Abs() and RMS() that resulted in glitches appearing.
- Post filter: added $\pi/2$ gain button

Code generation

- Fixed project object renaming issue in Matlab, Octave, Python and Scilab Frameworks.
- ANSI C library Framework: updated to v1.1.8
- Added more help to Arm-CMSIS DSP code wizard.

V5.2.1 (major release, 7 November 2022) – what's changed

Arm CMSIS-DSP Code generation

- Code generator updated to support CMSIS-DSP up to v1.14.1 (September 2022 release).
- Added support for double precision FIR filters on all Cortex-M cores (≥ v1.10.1).
- Added syntax highlighting to Arm-CMSIS DSP library functions.
- Updated Arm-Helium code generator to support Cortex-M85 code generation.

Signal analyser

- Added zero-phase filtering functionality – especially useful for analysing biomedical datasets filtered using IIR filters.
- Added data file playback offset functionality. Allowing for the playback of external data files from a specific point in time.
- Added extra scaling options in Data Import Wizard UI, allowing for a high degree of flexibility when dealing with ADC data, e.g. Q15, Q24, Q31.
- Improved Y-Axis zooming and panning for small amplitude datasets.
- Data analysis: Added independent upper and lower thresholds to zero-crossing detector.
- Data analysis: Improved data scaling on Savitzky-Golay derivative filters.
- Updated Triangle, Square and Sawtooth waveform generator.
- Better tooltips text highlighting and help.

Main UI

- Added ability to lock data ruler on main chart, and obtain data tooltip.
- Improved Axis Reset functionality on Phase and Magnitude axes.
- Added 'Ask a DSP expert' service for professional licence users.
- Added more examples, including 2nd order Butterworth biomedical example.

FilterScript

- Added baselinewanderkiller.afs example (low order FIR method for removing baseline wander in ECG).
- Improved bilinear() and roots() methods to handle zero valued entities, and exotic transfer functions.
- Fixed all issues with matrix/vector element assignments.

V5.1.2 (minor release, 27 April 2022)

What's changed

- Fixed various bugs and improved UI stability.
- Added augmentpoly() function to FilterScript, allowing for the design of Kolmogov-zurbenko filters and improving FIR filter sideband attenuation.
- Added kolmogorov_zurbenko.afs FilterScript example.

V5.1.1 (minor release, 1 February 2022)

General

- Added data rulers to main chart, allowing for more intuitive data analysis.

FilterScript

- Added firminphase() function, allowing for the design/conversion of zero-latency FIR filters.
- Improved argument error checking on firwin() and firarb() functions.
- Improved the undo function in the editor.

V5.1.0 (major release, 29 October 2021)

General

- Improved ANSI C SDK code generator
- Added 0dB and zero degrees/samples lines to main chart

Arm CMSIS-DSP code generator

- Improved footprint of implementation.
- Added double precision support for IIR filters.
- Added more help from AI engine.

Signal analyser

- Added new a robust zero-crossings method to data analysis
- Added the ability to specify unipolar and bipolar zero-crossing thresholds
- Added highlighting to the zero-crossing detector
- Added the ability to strip off DC offset from the input signal
- Increased the range of the signal analyser amplitudes
- Added the ability to directly import CSV and TXT files into signal controller via the import wizard.

V5.0.5 (major release, 2 September 2021)

ASN filter designer v5 provides developers with a new look and feel to the user interface, as well as over **37 product improvements**, including:

What's changed

- Two new code generators to C and C#.
- AI based project code generation wizard.
- Extra data analysis markers for more intuitive data analysis.
- Much more flexibility from ASN FilterScript, including the ability to independently program the primary and secondary filters.
- One-click Arm CMSIS-DSP code generator, allowing for automatic code generation to M0, M3, M7, M23, M33 and M55 Arm cortex devices.
- Code generation for AI/ML applications via Helium Cortex-M55 code for Armv8.1-M architectures.

V4.5.1 (minor release, 6 February 2021)

What's changed

- Added Getting started help menu with links to tutorials and videos
- Fixed various bugs and improved UI stability.
- Improved Real Cepstrum implementation.
- Ability to listen to input audio stream without effects of DSP blocks

V4.5.0 (major release, 01 December 2020)

What's changed

- One-click Arm CMSIS-DSP code generator, allowing for automatic code generation to M0, M3, M7, M23, M33 and M55 Arm cortex devices.
- Code generation for AI/ML applications via Helium Cortex-M55 code for Armv8.1-M architectures.
- Ability to delete imaginary filter coefficients without re-designing filter.
- Z-plane interactive mouse marker.
- Changed Biquad IIR BPF specification so that the order matches the number of sections. All existing designs will be automatically corrected.
- Added TKEO() math method – good for biomedical applications
- Signal analyser:
    - Added TKEO() math method – good for biomedical applications
    - Added Kurtosis() and 'Feedthrough' filter on H3 filter
- Updated Matlab, Python, Scilab frameworks to include new Math and filtering methods support.
- Deprecated Altair compose framework
- FilterScript 2.12:
    - Added fft(), arbmagphase() and peaking() functions
    - Added 3-band equaliser script example
    - Fixed data issue with abs(), angle(), real() and imag()
    - Updated importdata() function to support multiple column data

V4.4.1 (minor release, 7 May 2020)

- Fixed various bugs and improved UI stability.
- Tentative fix for version update checker (TLS 1.2 required)
- Added more coaching tips.
- **Signal generator/analyser**
    - Added Normalise function S-G filter in advanced data analysis options.
    - First selected signal generator item highlighted

V4.4.0 (major release, 10 February 2020)

- Fixed various bugs and improved UI stability.
- **Implemented ASN UI Experience pack 2020**
    - Added detailed UI coaching tips slides to both main designer and signal analyser UIs
    - Added detailed tooltips for all design methods, including hints and tips
    - Mouse pointer changes when hovering over a clickable item.
    - Errors or warnings in the status bar are now highlighted.
    - Added chart context menu for chart axis locking and rescaling
    - Restricted zooming and panning on Frequency axis to 0 -> Nyquist (default). User must now select 'complex axis' in order to pan and zoom between ±Nyquist.
- Ability to add an overlapped pole/zero pair to the unit circle without a warning message.
- **Signal generator/analyser**
    - Added a shortcut to allow for quick evaluation of impulse and step response
    - Disabled auto popup of filter summary when UI is opened
    - Added Hold off functionality to Advanced Data analysis, allowing for delaying data analysis.
    - First selected signal generator item highlighted

V4.3.3 (minor release, 18 November 2019)

- Fixed various bugs and improved UI stability.
- Added more help to UI.
- Updated licence manager to support Proxy servers.
- **Arm CMSIS-DSP code generator**
    - Fixed a few bugs with the FIR generator.
    - Added the ability to just get coefficients, rather than coefficients and test loop.
    - Added CMSIS-DSP uVision project examples to /Arm directory.

V4.3.1/2 (minor release, 10 October 2019)

- Internal release.

V4.3.0 (major release, 10 July 2019)

- Fixed various bugs and improved UI stability.
- Updated Matlab, Scilab and Compose automatic code generators
- **FilterScript**
    - Improved editor
    - Renamed **ShowH2DesignMarkers** keyword to **ShowH2DM**
    - Removed function constraint in DEMO mode
    - Fixed an issue with the series() function, that didn't allow for -ve to +ve ranges.
    - Ability to swap between matching passband and stopband specifications with Butter() function. Ability to now design Butterworth filters with -3dB passband specifications.
    - Improved accuracy of Bilinear (), mztrans() method.
    - Added explicit pre-warp frequency parameter to Bilinear function.

- **Signal generator**
    - Fixed glitch in triangle generator
    - Changed quadrate phase shift to +90 deg rather than -90 deg
- **Signal Analyser**
    - Added data file drag and drop functionality to UI
- **Main Filter Designer**
    - FIR: added three new methods: double differentiator, integrator and double integrator
    - IIR: Ability to swap between matching passband and stopband specifications with Butter method function. Ability to now design Butterworth filters with -3dB passband specifications.

V4.2.0 (major release, 9 January 2019)

General

- Fixed various bugs and improved UI stability.
- Improved help functions, and added intro UI for new users.
- Design makers minimum threshold now 0.01Hz (for biomedical)
- Adjustable gain for FIR differentiator
- **FilterScript**
    - Added two new functions for Comb filter design
    - Added extra check for NaN or Inf with H2 filter gain
- **Code generators**
    - Added Python and Altair Compose code generators and software frameworks.
    - Added one-click shortcut to framework files and examples
    - Updated Matlab, Octave and Scilab code generator.
- **Signal analyser**
    - Improved frequency measurement algorithm.
    - Increased Savitzky-Golay algorithm length to 195

V4.1.0 (major release, 22 June 2018)

General

- Fixed various bugs and improved stability.
- Updated licencing structure for subscription and perpetual licencing

  FilterScript
  - **digitaltf** now supports the creation of FIRs filters
  - Fixed an issue with syntax highlighting
- Updated Matlab, Octave and Scilab code generator.

  Signal analyser
  - Added data detrend option for frequency domain analysis
  - Added Normalise data option for Autocorrelation and Real Cepstrum analysis

V4.0.7 (minor release, 26 Feb 2018)

General

- Fixed various bugs and improved stability.

V4.0.6 (minor release, 31 October 2017)

General

- Fixed various bugs and improved stability.
- Fixed scaling and quantisation issue with the single section IIR filter designer.
- Fixed scaling issue in the signal analyser when using Fixed-point FIRs.
- Updated Matlab, Octave and Scilab Framework.
- Improved the UI help for the IIR and FIR designers.

V4.0.5 (major release, 3 October 2017)

General

- 10% performance increase and stability.
- Added support for ARM CMSIS DSP and Xilinx Vivado software frameworks.
- C/C++ framework complex filter support.
- Added All-pass filter designer UI.
- Improved help examples.
- Improved automatic code and documentation syntax highlighting.

Signal analyser

- Audio playback increased to 48kHz.
- Added Data import wizard.
- Added Advanced data analysis UI.

ASN FilterScript

- 20 new functions (more digital filter designers).

- Analog-to-digital filter design support (bilinear and matched z-transform).
- Symbolic Laplace transfer functions.
- Improved IDE, including more help and Intellisens.

Version 3

v3.1.4 (minor release, 9 March 2017)

- Improved stability.
- FilterScript:
    - Added **diff** and **savgolay** functions.
    - Fixed bug with interface variable stepsize.
- Signal analyser:
    - Added **Input Delay** functionality to UI, allowing for designers to shift the input waveform and visually compensate for the cascade's group/phase delay.
    - Added signal generator playback status icon.
- Filter summary: Improved formatting of the specification table.

v3.1.2 (minor release, 24 November 2016)

- Fixed various bugs and improved stability.
- Improved UI font scaling.
- Fixed IIR specification table for BPF and BSF when updating with design markers.
- Filter summary:
    - Added export to Microsoft Excel functionality.
    - Added ability to separate Real and Imaginary coefficients arrays in ANSI C.

v3.1.0 (minor release, 20 June 2016)

- Improved stability.
- Improved Help files.
- Improved ASN FilterScript data formatting.
- Removed phase correction scaling at 0Hz.
- Added product update check.
- Added Implementation cost to filter summary.
- IIR and FIR specification tables: Improved error checking and changed attenuation specification to positive values only.
- Fixed a computation issue with FIR filter designer.
- Added 'Median filter' option to H3 filter options.

v3.0.2 (minor release, 22 February 2016)

- Fixed various axes scaling issues with the charts.

- Fixed group delay estimate for H2 FIR filters.
- Added 'FarrowDelay.afs' filter script example.
- Added 'Phase analysis' option to signal analyser.

v3.0.1 (minor release, 25 January 2016)

- Improved stability.
- Improved the UI help for the IIR and FIR specification tables.
- Improved clarity of various UI elements.
- Increased sampling rate resolution to 4 decimal places.
- Updated documentation.
- Added 'output gain' option to H3 filter.

v3.0.0 (major release, 6 January 2016)

General

- Fixed various bugs and improved stability.
- Improved UI, including better panning of the main chart and more tooltips.
- Fixed bug with IIR and FIR specification table validation algorithm.
- Added three IIR filter structures: Direct Form I, Direct Form II and Direct Form II Transposed.
- Added two FIR filter structures: Direct Form and Transposed Direct Form.
- Added project design notes functionality.
- Improved framework examples.
- Improved Filter script examples, including more documentation.

Signal analyser

- Audio playback increased to 44.1kHz.
- Added 3rd (H3) post lowpass filter.
- Added "Amplitude modulation" function to signal generator.
- Added "Sqr" math function to Signal analyser.
- Added two more time domain analysis methods (autocorrelation, Real Cepstrum).
- Support for CSV data file import.

v2.0.28 (minor release, 16 September 2015)

- Various bug fixes.
- Added stem chart to time domain signal analyser options.
- Added L1 scaling to quantisation options.
- Improved clarity of phase unwrapping algorithm threshold option.
- Improved appearance for Windows 10.

v2.0.27 (major release, 13 July 2015)

v2 product release.