API Collection

# Single-channel biquadratic filters

Filter a single-channel signal with a cascade of biquadratic sections.

## Overview

The vDSP library implements biquadratic filtering as a cascade of individual infinite impulse response (IIR) filters called *sections*. Each section has its own set of feedback and feedforward coefficients, and implements a direct-form 1 filter.

When the biquadratic filter function executes, the sections execute in sequence. Each section processes the entire input signal and passes its output to the next section for further processing.

> **Note**
>
> The vDSP biquadratic filters work in place. That is, the source and destination pointers may point to the same memory.

## Topics

### Biquadratic filter essentials

{} Applying biquadratic filters to a music loop

Change the frequency response of an audio signal using a cascaded biquadratic filter.

{} Creating an audio unit extension using the vDSP library

Add biquadratic filter audio-effect processing to apps like Logic Pro X and GarageBand with the Accelerate framework.

## Creating a single-channel biquadratic filter setup

`vDSP_biquad_CreateSetup`

Builds a data structure that contains precalculated data for use by a single-precision cascaded biquadratic filter function.

`typealias vDSP_biquad_Setup`

A data structure that contains precalculated data for use by the single-precision cascaded biquadratic IIR filter function.

`vDSP_biquad_CreateSetupD`

Builds a data structure that contains precalculated data for use by a double-precision cascaded biquadratic filter function.

`typealias vDSP_biquad_SetupD`

A data structure that contains precalculated data for use by the double-precision cascaded biquadratic IIR filter function.

## Applying a single-channel biquadratic filter

`vDSP_biquad`

Applies a single-precision single-channel biquadratic IIR filter.

`vDSP_biquadD`

Applies a double-precision single-channel biquadratic IIR filter.

## Setting the coefficients of a single-channel biquadratic filter

`vDSP_biquad_SetCoefficientsSingle`

Sets single-precision coefficients of the specified single-channel biquadratic filter setup object.

`vDSP_biquad_SetCoefficientsDouble`

Sets double-precision coefficients of the specified single-channel biquadratic filter setup object.

## Destroying a single-channel biquadratic filter setup

`vDSP_biquad_DestroySetup`

Destroys a single-precision biquadratic filter setup object.

`vDSP_biquad_DestroySetupD`

Destroys a double-precision biquadratic filter setup object.

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# See Also

## Vector filtering

- Biquadratic IIR filters

  Apply biquadratic filters to single-channel and multichannel data.

- Multichannel biquadratic filters

  Filter a multichannel signal with a cascade of biquadratic sections.

- Finite impulse response filters

  Perform finite impulse response filtering with decimation and antialiasing on vectors of real or complex values.

- Recursive filters

  Perform two-pole two-zero recursive filtering on a vector.