A Guide to the Implementation of Ambisonics Super Stereo

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Abstract : In this work, we introduce an Ambisonics decoder with an implementation of the C-format, also called Super Stereo. This format is an alternative to conventional stereo and binaural decoding. Unlike those, this format conveys audio information from the horizontal plane and works with stereo speakers and headphones. The two C-format channels can also return a reconstructed planar B-format. This work provides an open-source implementation for this format. We implement an all-pass filter for signal quadrature, as required by the decoding equations. This filter works with six Biquads in a cascade configuration, with values for control frequency and quality factor discovered experimentally. The phase response of the filter delivers a small error in the 20-14.000Hz range. The decoder has been tested with audio sources up to 192kHz sample rate, returning pristine sound quality and detailed stereo image. It has been included in the Envelop for Live suite and is available as an open-source repository. This decoder has applications in Virtual Reality and 360° audio productions, music composition, and online streaming.

Keywords : ambisonics, UHJ, quadrature filter, virtual reality, Gerzon, decoder, stereo, binaural, biquad

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