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Data Interpolation Beyond Aliasing

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Proper spatial sampling is critical for many applications. If the sampling criterion is not met, artifacts appear for example in images. Last year an iterative approach was presented using wave field extrapolation to interpolate spatially aliased signals. This main concept behind this approach is that after inverse wave field extrapolation the signal is concentrated in a small region with a high amplitude, while the aliasing artifacts are spread-out through the domain. Inverse wave field extrapolation focusses optimally at one depth, making the performance of the reconstruction depth dependent. Obviously the method can be repeated for several depths. This year we show an alternative approach using an imaging/inverse-imaging approach. The demonstration of this approach is extended to 2D-arrays where the sampling limitations are even more critical. Moreover we show in this paper that the interpolation approach is not limited to near-field data, but can also be used on far-field data (plane waves). The Radon transform can be used for plane waves to focus the data. The approach is demonstrated using modeled and measured data for linear and 2D arrays.