Deconvolution

Deconvolution is used in time domain data analysis for removal of broadening effects due to instrumental resolution. In this context deconvolution is mainly concerned with the IRF (or lamp function) including the finite light source pulse width and other broadening effects (e.g. electronics). The effects caused by the IRF are dominant in the onset of a decay curve.

How deconvolution should be done

Best, not at all  . At PicoQuant, for a variety of good reasons (see IRF) we use reconvolution instead. If one cannot resist applying deconvolution, the best way of doing it (at least for time domain data) would be via Fourier transform. Fourier transform is a slow process (even with FFT) and it has to be done twice, since the deconvoultion itself is performed on the transformed data set, which has to be retransformed afterwards.

Deconvolution in other contexts

The most prominent application of deconvolution techniques is imaging. Usually one tries to remove blurring by deconvolution (or deconvolution-like) techniques. What holds for time domain data, also holds for imaging: Deconvolution has a disturbingly high potential for producing artefacts - and there is no way of telling apart artefacts and effects. The images may look nicer (which undoubtedly is valuable especially for publication purposes), but the content of information has not necessarily improved.

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