**Impulse response** is the vibrational response of a dynamic system having been exposed to an infinitesimally short impulsive disturbance. Most often the input is force, while the output (response) is velocity per force unit (Dirac delta). Fig. 1 below gives an example of a typical impulse response of a violin bridge mounted on the instrument. When regarded in the frequency domain, most of the body resonances are clearly visible.

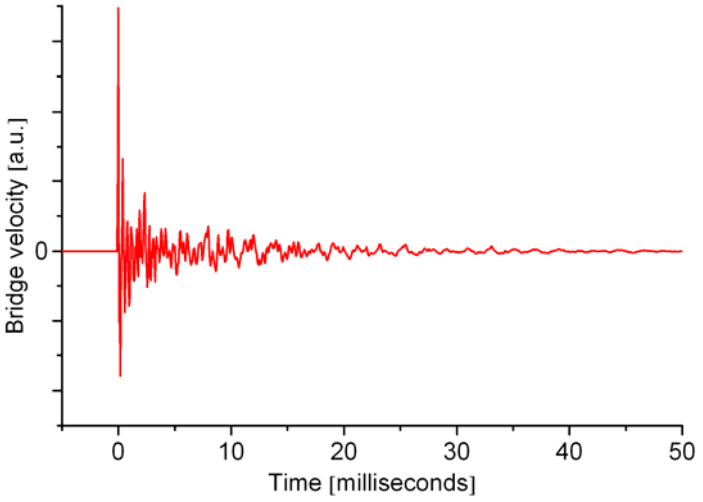


**Figure 1:** Example of impulse response from the bridge of a violin. At the time $t$ = 0, the bridge was excited laterally with an impulse of infinitesimally short duration. The response shown is its lateral velocity, the spectrum of which spectrum gives a nearly complete picture of the instrument body's resonances.

In practice, the bridge is excited by a blow with a force/impact hammer, the impulse of which is not as short lasting as required for getting a true impulse response of the system. The spectrum of infinitesimally short impulse contains all frequencies equally distributed, while any practical impulse will have a limited bandwidth and maybe some spectral humps within this range. However, mathematically it is a straightforward matter to reconstruct the response to a true impulse. This is done by *deconvolving* the response by the practical input impulse—which in practice most often is performed as a division between these two signals in the frequency domain. When returning to the time domain, the response of an ideal impulse excitation is seen.

Knowing the impulse response of the system, one can easily calculate its response to any input signal, short or long, provided the system behaves linearly (see *Convolution*).