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## Analytical solutions at amplitude and time measurements from discrete sampling of pseudo-Gaussian signals

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Amplitude and time measurements from digitized signals of the pseudo-Gaussian shape are considered. This form covers a big part of applications. The least squares method (l.s.m.) is chosen as the optimal algorithm for determining signal amplitude  $A$  and timestamp  $t_0$ . For a pseudo-Gaussian profile with an uncorrelated sampling the l.s.m. is reduced to analytical formulas for  $A$  and  $t_0$  consistent with experimental data. This permits to estimate the desired number of points  $N_s$  on a profile depending on electronic noise, required accuracy of  $A$ ,  $t_0$  and electronic filter parameters. The obtained results for  $N_s$  are illustrated with qualitative estimates in accordance with the Nyquist-Shannon-Kotelnikov sampling theorem. The optimality of electronic filter forming the waveform is analyzed in terms of the excess noise factor with calculation of the autocorrelation function from stochastic noise sources. It permits to define non-diagonal weight matrix elements in the l.s.m. with formulation of requirements for neglecting of sampling correlations desired for application of the analytical solution. This solution is convenient for a use in processing of signal profile data and it can be a candidate for an algorithm embedded into chips to transmit to the external world required values  $A$ ,  $t_0$ ,  $\chi^2$  and number of degrees of freedom  $N_d$ .

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