Fourier Transform of sine - Gaussian

Define Functions

In[83]:= sineGaussian[t_] := $A\, e^{-\Gamma t^2}$ Sin[2 π f_c t]

In[84]:= FT[f_] := $\mathrm{Abs}\left[\frac{1}{\sqrt{T}} \int_0^T \left(\mathrm{sineGaussian}[t]\, e^{2 \pi f i t}\right) dt\right]$

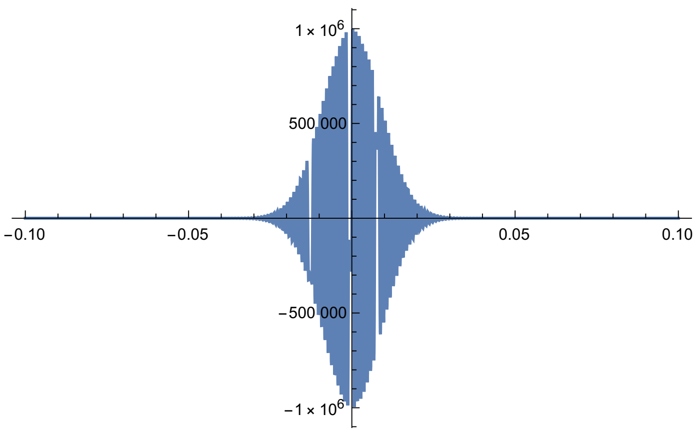
Define constants

In[116]:= T = 1; f_c = 1*^3; Q = 1; $\Gamma = \frac{2 \pi f_c}{Q^2}$; A = 1*^6;

Plot time-series

In[117]:= Plot[sineGaussian[t], {t, -0.1, 0.1}, PlotRange → All]

Out[117]=



~~If I copy the output of typing FT[f] and turn it into a new function, and plot the new function, it is significantly faster than just plotting FT[g] - this takes much longer.~~

In[44]:=

Plot Fourier Transform

In[118]:=
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LogLogPlot[Evaluate[FT[f]], {f, 0.01, 10^5}, PlotRange → Full]
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General: Exp[−1570.83] is too small to represent as a normalized machine number; precision may be lost.

General: Exp[−4716.9 − 6283.59 ⅈ] is too small to represent as a normalized machine number; precision may be lost.

General: Exp[−4716.84 + 6283.71 ⅈ] is too small to represent as a normalized machine number; precision may be lost.

General: Further output of General::munfl will be suppressed during this calculation.

Out[118]=