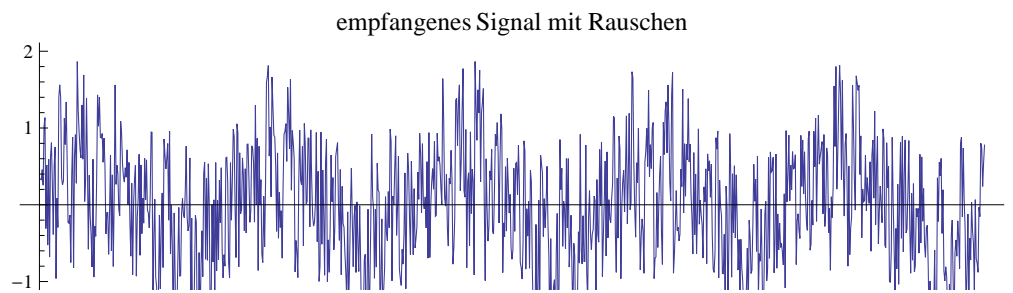
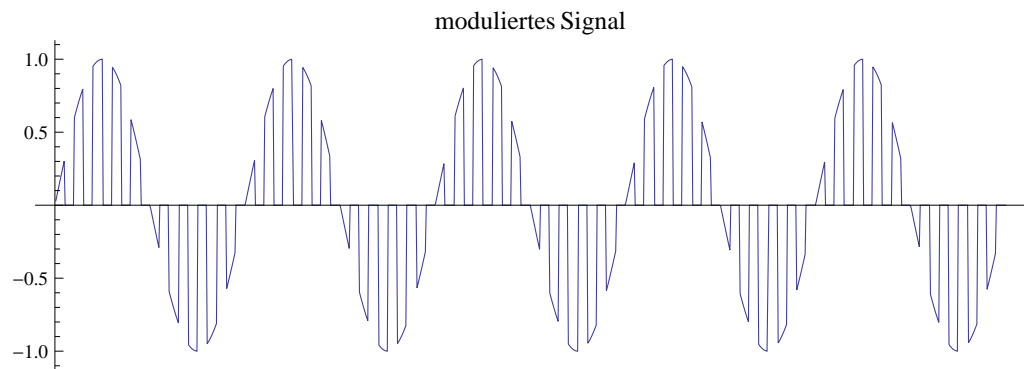
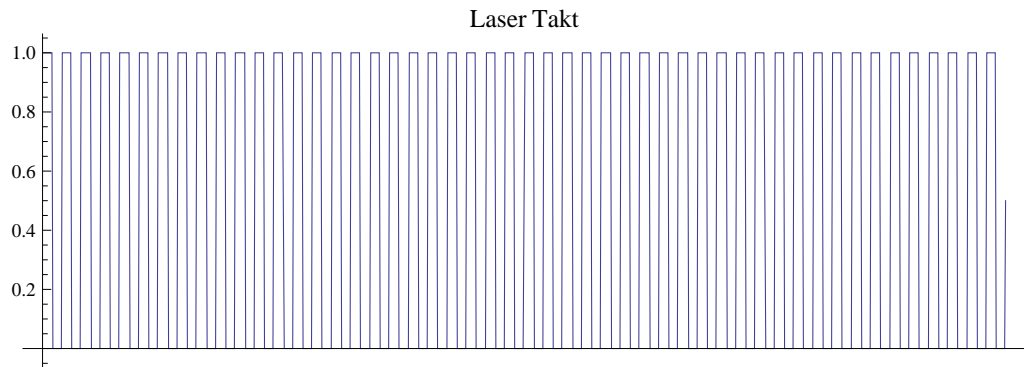
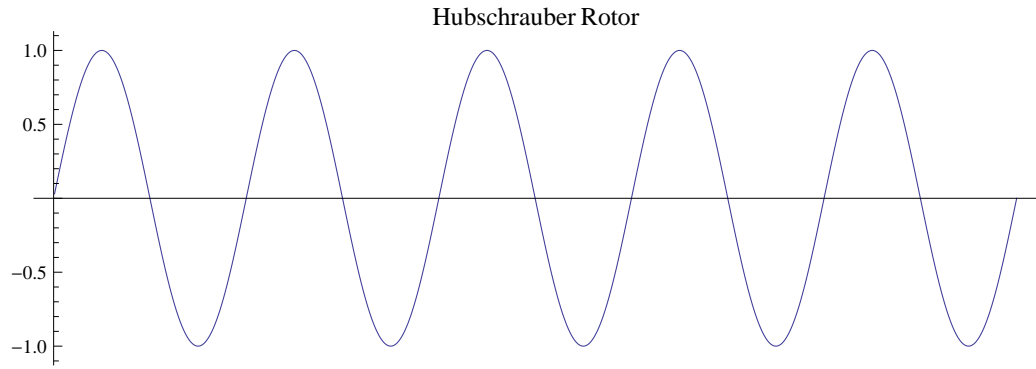


```

Manipulate[
BlockRandom[
k = 1024;
knyq = 1 + k / 2;
signal = N[Sin[Range[k] / k * Pi * 2 * signalFrequency]];
signalPlot = ListPlot[signal, Joined → True, Ticks → {None, Automatic},
  AspectRatio → 1 / 3, PlotLabel → "Hubschrauber Rotor" ];
scan = N[(Sign[Sin[Range[k] / k * Pi * 2 * scanFrequency]] + 1) / 2];
scanPlot = ListPlot[scan, Joined → True,
  Ticks → {None, Automatic}, AspectRatio → 1 / 3, PlotLabel → "Laser Takt" ];
Do[signal[[i]] = signal[[i]] * scan[[i]], {i, 1, k}];
reflectionPlot = ListPlot[signal, Joined → True, Ticks → {None, Automatic},
  AspectRatio → 1 / 3, ImageSize → 512, PlotLabel → "moduliertes Signal" ];
SeedRandom[rand];
randoms = RandomReal[{-1, 1}, k];
signal = signal + randoms;
randomsPlot = ListPlot[signal, Joined → True, Ticks → {None, Automatic},
  AspectRatio → 1 / 3, PlotLabel → "empfangenes Signal mit Rauschen" ];
Do[signal[[i]] = signal[[i]] * scan[[i]], {i, 1, k}];
multiplierPlot =
  ListPlot[signal, Joined → True, Ticks → {None, Automatic}, AspectRatio → 1 / 3,
    ImageSize → 512, PlotLabel → "Signal multipliziert mit Scan Takt" ];
rp = Fourier[signal];
f0 = cut * knyq;
Do[rp[[i]] = rp[[i]] * (f0 / (f0 + i)) ^ roll, {i, 1, knyq}];
Do[rp[[i+knyq]] = Conjugate[rp[[knyq - i]]], {i, 1, knyq - 2}];
rs = Abs[Take[rp, knyq]];
r = InverseFourier[rp];
lowpassPlot = ListPlot[r, Joined → True, Ticks → {None, Automatic},
  AspectRatio → 1 / 3, ImageSize → 512, PlotLabel → "Tiefpassfilter" ];
GraphicsColumn[{signalPlot, scanPlot, reflectionPlot,
  randomsPlot, multiplierPlot, lowpassPlot}]]
,
{{cut, 0.05, "Grenzfrequenz"}, 0.01, 1},
{{roll, 2, "Flankensteilheit"}, 1, 4},
{{scanFrequency, 50, "Scan Frequenz"}, 1, 200},
{{signalFrequency, 5, "Rotor Frequenz"}, 1, 200},
{{rand, 0, ""}, Button["randomize", rand = RandomInteger[2^64 - 1]] &},
TrackedSymbols ⇒ Manipulate, AutorunSequencing → {1, 2},
ControlPlacement → Bottom
]

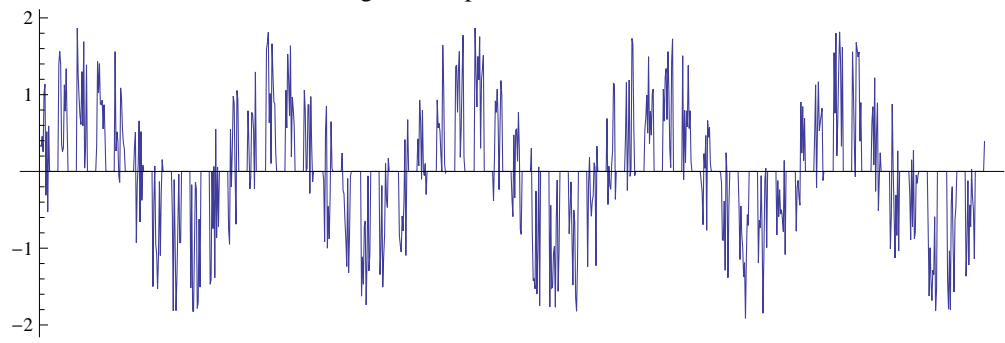
```



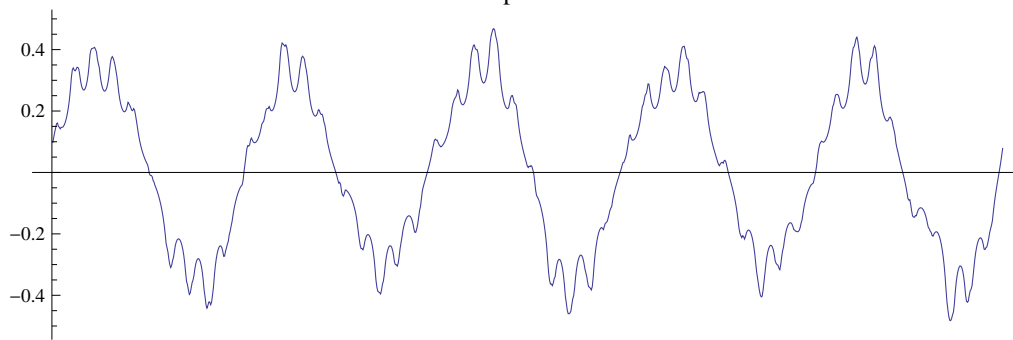
Out[1070]=



Signal multipliziert mit Scan Takt



Tiefpassfilter



Grenzfrequenz +

Flankensteilheit +

Scan Frequenz +

Rotor Frequenz +

randomize