```
Δt := 100;
```

$$Ig[t\_] := e^{-4 \, Log[2] \, \left(\frac{t}{\Delta t}\right)^2} \quad (*gaussian \; pulse \; intensity. \; FWHM=\Delta t*)$$

$$Is[t\_] := Sech\left[1.763 \, \frac{t}{\Delta t}\right]^2 (*sech^2 \; pulse \; intensity. \; FWHM=\Delta t*)$$

```
Plot[{Ig[t], Is[t]}, {t, -200, 200}, PlotLegends → {"gaussian", "sech²"}]
```
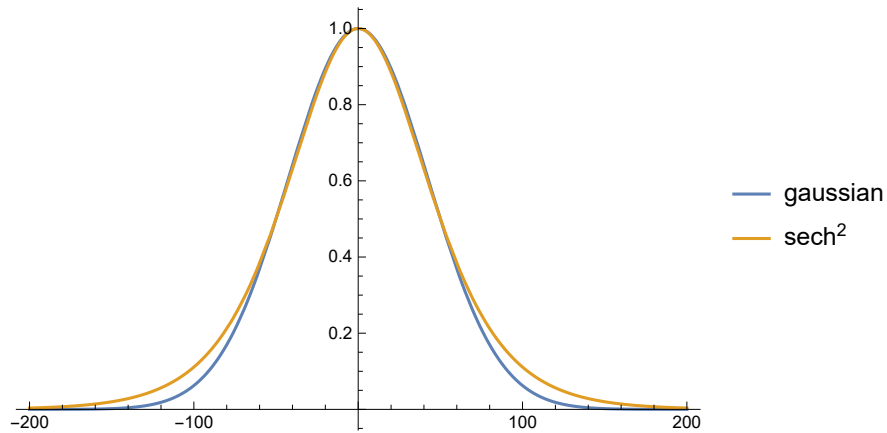


```
Ig[50.]
Is[50.]

0.5

0.499911
```
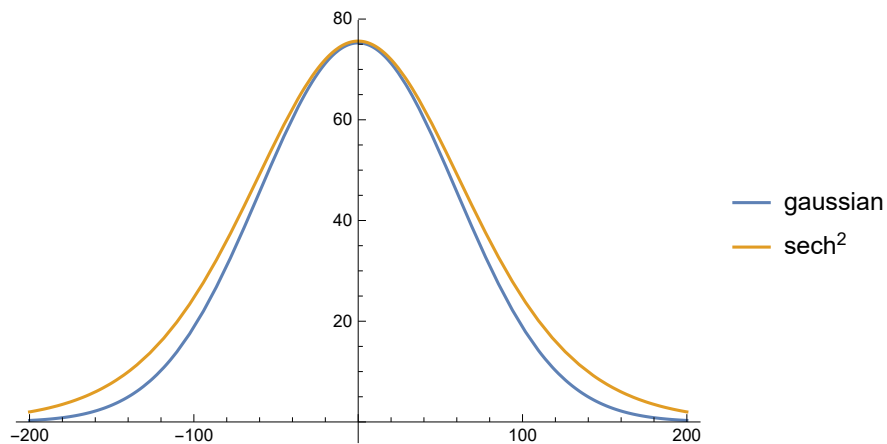
```
(*Autocorrelations*)
ACg[τ_] = Integrate[Ig[t] Ig[t - τ], {t, -∞, ∞}];
ACs[τ_?NumericQ] := NIntegrate[Is[t] Is[t - τ], {t, -∞, ∞}];
(*'?NumericQ' is for delaying the numerically evaluation*)
```

```
Plot[{ACg[τ], ACs[τ]}, {τ, -200, 200}, PlotLegends → {"gaussian", "sech²"}]
```

```
sol = FindRoot[ACg[x] - 0.5 ACg[0], {x, Δt / 2}] (*find the gaussian's AC HWHM*)
Δt / (2 * x /. sol) (*pulse FWHM / AC FWHM*)
```

$\{x \to 70.7107\}$

0.707107

```
sol = FindRoot[ACs[x] - 0.5 ACs[0], {x, Δt / 2}] (*find the sech²'s AC HWHM*)
Δt / (2 * x /. sol) (*pulse FWHM / AC FWHM*)
```

$\{x \to 77.1295\}$

0.648261

```
0.65 * 6 * 1.4 / 1.62 * 50
```

168.519