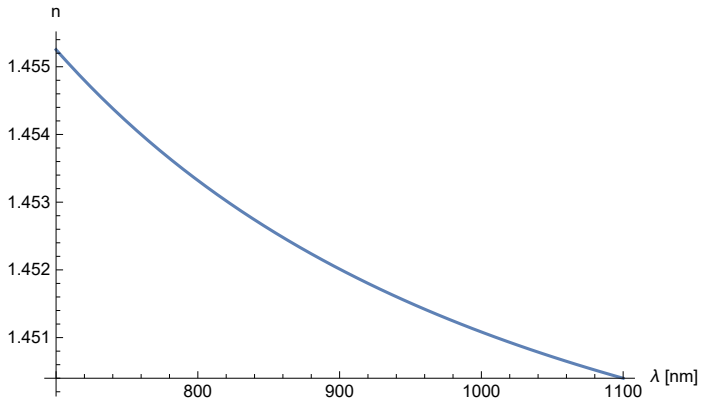
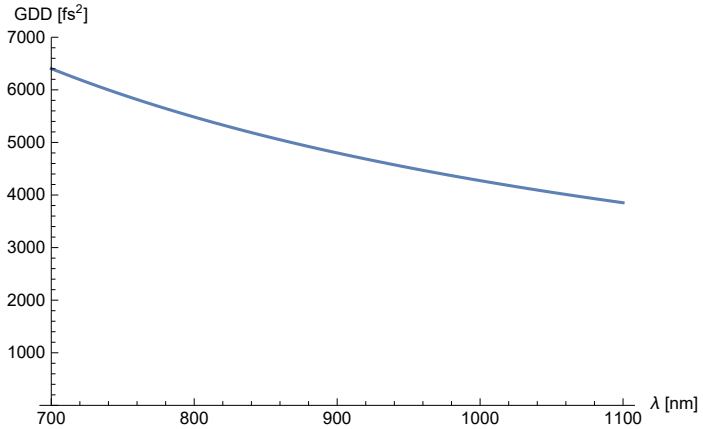
```
μm = 10^-6;
c = 299 792 458;
fs = 10^-15;
mm = 10^-3;
nm = 10^-9;

(*Refractive index. Ref: refractiveindex.info*)
nfs[λ_] := 1.447193 + 383 343.3 × 10^-8 / (λ / μm)^2 + 5.661342 × 10^-5 / (λ / μm)^4 (*fused silica matching liquid*)
Plot[nfs[λ nm], {λ, 700, 1100}, AxesLabel → {"λ [nm]", "n"}]
```

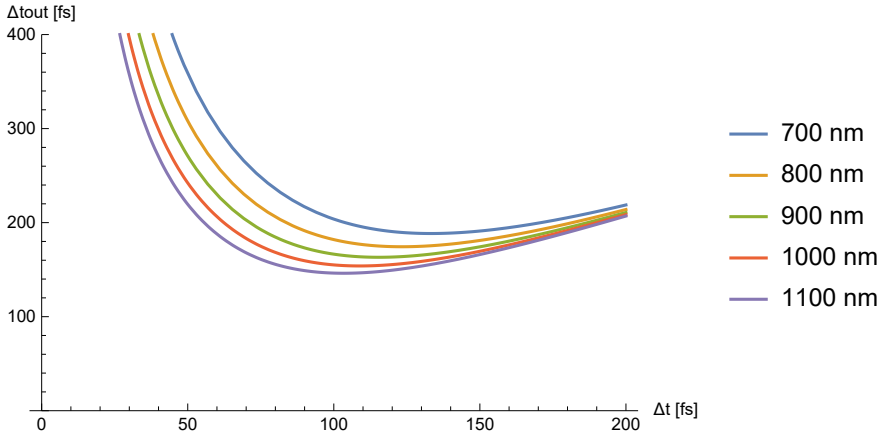



```
(*Group velocity dispersion (GVD). Ref: Young 2015 and Newport website*)
GVDfs[λ_] := λ^3 nfs''[λ] / (2 π c^2)
(*Group delay dispersion
 (GDD = GVD*L, where L is the material thickness) vs wavelength*)
GDDfs[L_, λ_] := L * GVDfs[λ]
Plot[GDDfs[100 mm, λ nm] / fs^2, {λ, 700, 1100},
 PlotRange → {0, 7000}, AxesLabel → {"λ [nm]", "GDD [fs^2]"}]
```




```
Δtout[Δt_, GDD_] := Sqrt[Δt^4 + 16 Log[2]^2 GDD^2] / Δt (*Gaussian pulse broadening*)
(*Ref: Eq8 in http://www.newport.com/The-Effect-
  of-Dispersion-on-Ultrashort-Pulses/602091/1033/content.aspx*)
```

```
(*output pulsewidth vs input pulsewidth, gaussian pulses*)
Plot[Evaluate[Table[Δtout[Δt fs, GDDfs[100 mm, λ nm]] / fs, {λ, 700, 1100, 100}]],
 {Δt, 0, 200}, PlotRange → {0, 400}, AxesLabel → {"Δt [fs]", "Δtout [fs]"},
 PlotLegends → {"700 nm", "800 nm", "900 nm", "1000 nm", "1100 nm"}]
```




```
Δtout[55 fs, GDDfs[100 mm, 700 nm]] / fs
```

327.441