```
> Vcarboxylation1 := Cs·Vsmax / (Cs + (1210·(1 + 200/292)))
```

$$Vcarboxylation1 := \frac{Cs\ Vsmax}{Cs + \frac{148830}{73}} \tag{1}$$

```
> Vcarboxylation2 := Cs·Vsmax / (Cs + (1210·(1 + 20/292)))
```

$$Vcarboxylation2 := \frac{Cs\ Vsmax}{Cs + \frac{94380}{73}} \tag{2}$$

```
> with(plots):
> Vw1 := eval(Vcarboxylation1, Vsmax = 170.28): Vt1 := eval(Vcarboxylation1, Vsmax
    = 286.79): Vw2 := eval(Vcarboxylation2, Vsmax = 170.28): Vt2 := eval(Vcarboxylation2,
    Vsmax = 286.79):
> p1 := plot([Vw1, Cs = 0..1000], color = "SteelBlue", legend
    = ["Carboxylation by wild maize (RuBisCo = 170.28 umol/m2)"], legendstyle = [font
    = ["HELVETICA", 15]], labelfont = ["HELVETICA", 15], axesfont = ["HELVETICA",
    15]): p2 := plot([Vt1, Cs = 0..1000], color = "Green", legend
    = ["Carboxylation by transgenic maize (RuBisCo = 286.79 umol/m2)"], legendstyle = [font
    = ["HELVETICA", 15]], labelfont = ["HELVETICA", 15], axesfont = ["HELVETICA",
    15]): p3 := plot([Vw2, Cs = 0..1000], color = "SteelBlue", legend = [
    "Carboxylation by wild maize (RuBisCo = 170.28 umol/m2)"], legendstyle = [font
    = ["HELVETICA", 15]], labelfont = ["HELVETICA", 15], axesfont = ["HELVETICA",
    15]): p4 := plot([Vt2, Cs = 0..1000], color = "Green", legend
    = ["Carboxylation by transgenic maize (RuBisCo = 286.79 umol/m2"], legendstyle = [font
    = ["HELVETICA", 15]], labelfont = ["HELVETICA", 15], axesfont = ["HELVETICA",
    15]):
```

```
> Voxygenation1 := 200·Vsmax / (200 + (292·(1 + Cs/1210)))
```

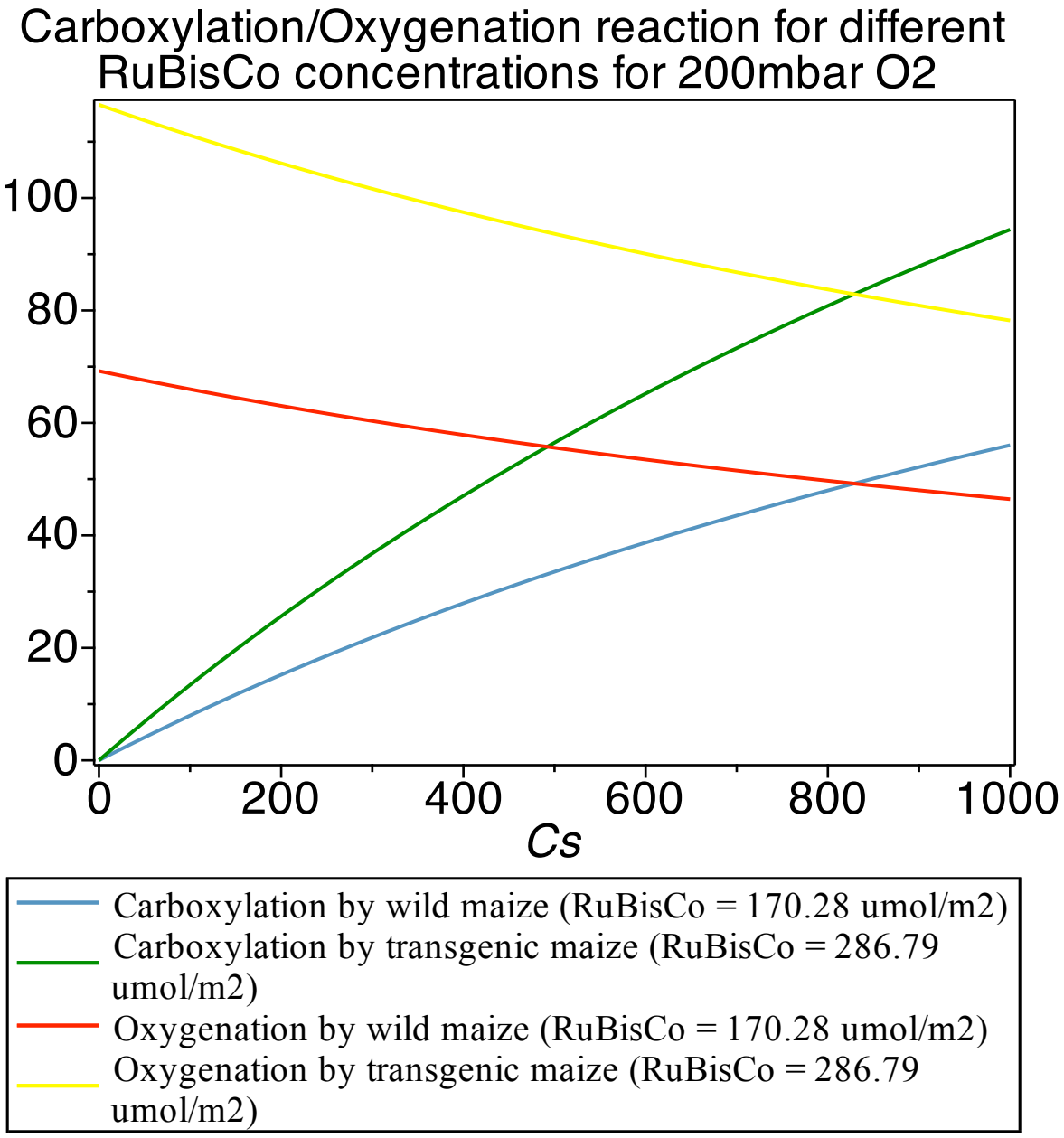
$$Voxygenation1 := \frac{200\ Vsmax}{492 + \frac{146\ Cs}{605}} \tag{3}$$

```
> Voxygenation2 := 20·Vsmax / (20 + (292·(1 + Cs/1210)))
```

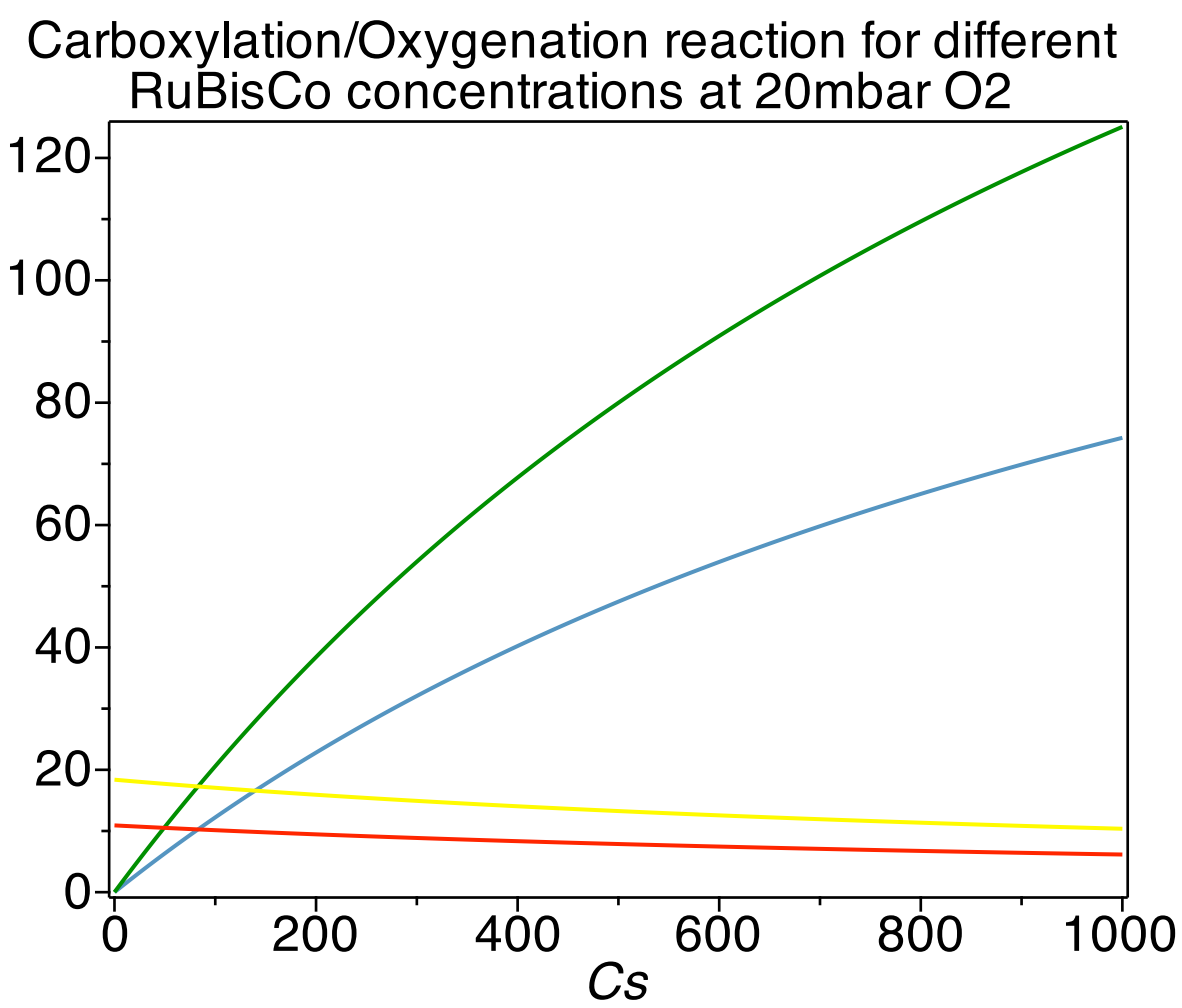
$$Voxygenation2 := \frac{20\ Vsmax}{312 + \frac{146\ Cs}{605}} \tag{4}$$

```
> with(plots):
```

```
> Vow1 := eval(Voxygenation1, Vsmax = 170.28) : Vot1 := eval(Voxygenation1, Vsmax
      = 286.79) : Vow2 := eval(Voxygenation2, Vsmax = 170.28) : Vot2 := eval(Voxygenation2,
       Vsmax = 286.79) :
> p5 := plot([Vow1, Cs = 0..1000], color = "Red", legend
      = ["Oxygenation by wild maize (RuBisCo = 170.28 umol/m2)"], legendstyle = [font
      = ["HELVETICA", 15]], labelfont = ["HELVETICA", 15], axesfont = ["HELVETICA",
      15]) : p6 := plot([Vot1, Cs = 0..1000], color = "Yellow", legend
      = ["Oxygenation by transgenic maize (RuBisCo = 286.79 umol/m2)"], legendstyle = [font
      = ["HELVETICA", 15]], labelfont = ["HELVETICA", 15], axesfont = ["HELVETICA",
      15]) : p7 := plot([Vow2, Cs = 0..1000], color = "Red", legend = [
     "Oxygenation by wild maize (RuBisCo = 170.28 umol/m2)"], legendstyle = [font
      = ["HELVETICA", 15]], labelfont = ["HELVETICA", 15], axesfont = ["HELVETICA",
      15]) : p8 := plot([Vot2, Cs = 0..1000], color = "Yellow", legend
      = ["Oxygenation by transgenic maize (RuBisCo = 286.79 umol/m2)"], legendstyle = [font
      = ["HELVETICA", 15]], labelfont = ["HELVETICA", 15], axesfont = ["HELVETICA",
      15]) :
> display([p1, p2, p5, p6], axes = "boxed", title
      = "Carboxylation/Oxygenation reaction for different RuBisCo concentrations for 200mbar
     O2", titlefont = ["HELVETICA", 15])
```




```
> display( (p3, p4, p7, p8), axes = "boxed", title
      = "Carboxylation/Oxygenation reaction for different RuBisCo concentrations at 20mbar O2 ",
      titlefont = ["HELVETICA", 15])
```




> $Ac1 := \frac{\left(Cs - \left(3.82 \cdot 10^{-4} \cdot 200000\right)\right) \cdot Vsmax}{Cs + 1210 \cdot \left(1 + \frac{200000}{292000}\right)} - 0.01 \cdot Vsmax$

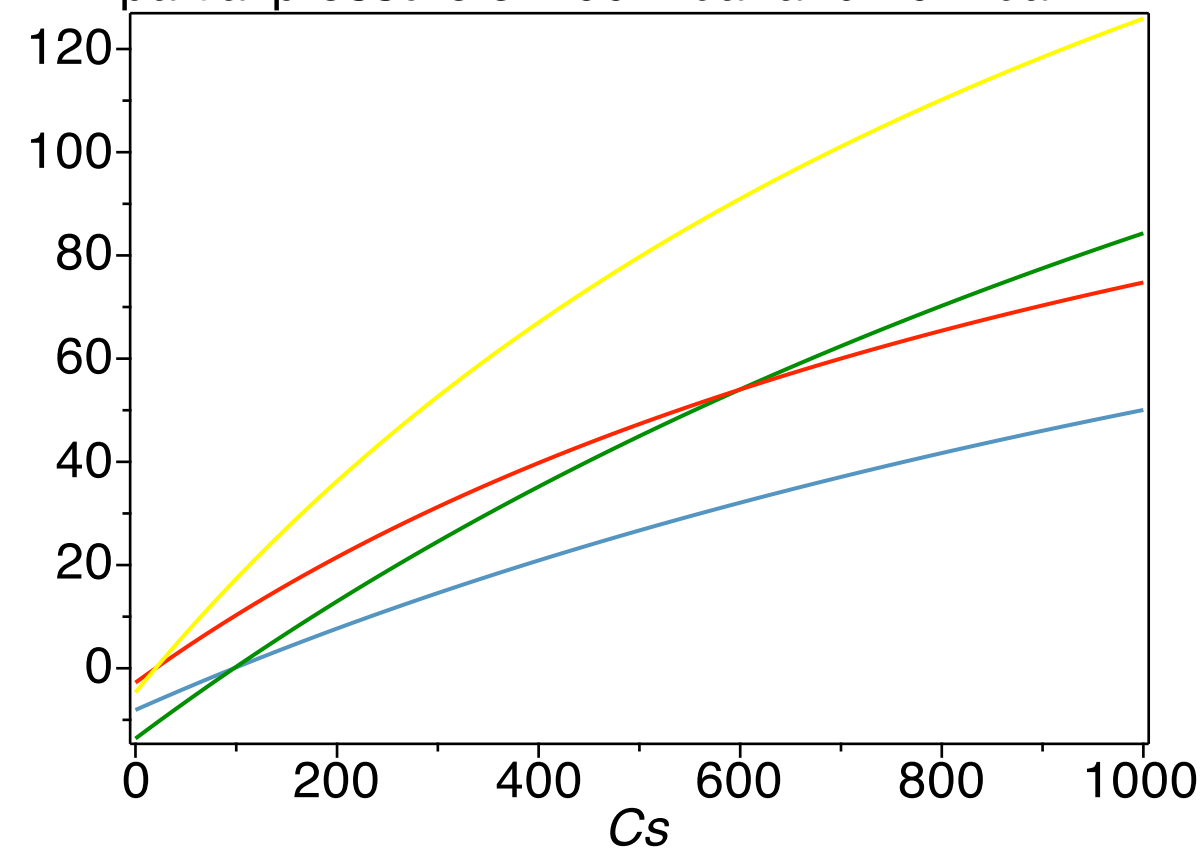
$$Ac1 := \frac{(Cs - 76.40000000)\ Vsmax}{Cs + \frac{148830}{73}} - 0.01\ Vsmax \quad \textbf{(5)}$$

> $Ac2 := \frac{\left(Cs - \left(3.82 \cdot 10^{-4} \cdot 20000\right)\right) \cdot Vsmax}{Cs + 1210 \cdot \left(1 + \frac{20}{292000}\right)} - 0.01 \cdot Vsmax$

**(6)**

$$Ac2 := \frac{(Cs - 7.640000000)\, Vsmax}{Cs + \frac{1766721}{1460}} - 0.01\, Vsmax \qquad \textbf{(6)}$$

```
> with(plots):
> A1O1 := eval(Ac1, Vsmax = 170.28): A2O1 := eval(Ac1, Vsmax = 286.79): A1O2 :=
      eval(Ac2, Vsmax = 170.28): A2O2 := eval(Ac2, Vsmax = 286.79):
> p9 := plot([A1O1, Cs = 0..40], color = "SteelBlue", legend
      = ["Wild Maize: RuBisCo = 170.28 umol/m2, O2 = 200 mbar"], legendstyle = [font
      = ["HELVETICA", 15]], labelfont = ["HELVETICA", 15], axesfont = ["HELVETICA",
      15]): p10 := plot([A2O1, Cs = 0..40], color = "Green", legend
      = ["Transgenic Maize: RuBisCo = 286.79 umol/m2, O2 = 200 mbar"], legendstyle = [font
      = ["HELVETICA", 15]], labelfont = ["HELVETICA", 15], axesfont = ["HELVETICA",
      15]): p11 := plot([A1O2, Cs = 0..40], color = "Red", legend
      = ["Wild Maize: RuBisCo = 170.28 umol/m2, O2 = 20 mbar"], legendstyle = [font
      = ["HELVETICA", 15]], labelfont = ["HELVETICA", 15], axesfont = ["HELVETICA",
      15]): p12 := plot([A2O2, Cs = 0..40], color = "Yellow", legend
      = ["Transgenic Maize: RuBisCo = 286.79 umol/m2, O2 = 20 mbar"], legendstyle = [font
      = ["HELVETICA", 15]], labelfont = ["HELVETICA", 15], axesfont = ["HELVETICA",
      15]):
> display([p9, p10, p11, p12], axes = "boxed", title
      = "CO2 assimilation rate in bundle sheath as a function of CO2 partial pressure in bundle
      sheath for O2 partial pressure of 200 mbar and 20 mbar ", titlefont = ["HELVETICA", 15])
```




> $Ac3 := \dfrac{\left(Cs - \left(3.82 \cdot 10^{-4} \cdot 2000\right)\right) \cdot Vsmax}{Cs + 1210 \cdot \left(1 + \dfrac{2000}{292000}\right)} - 0.01 \cdot Vsmax$

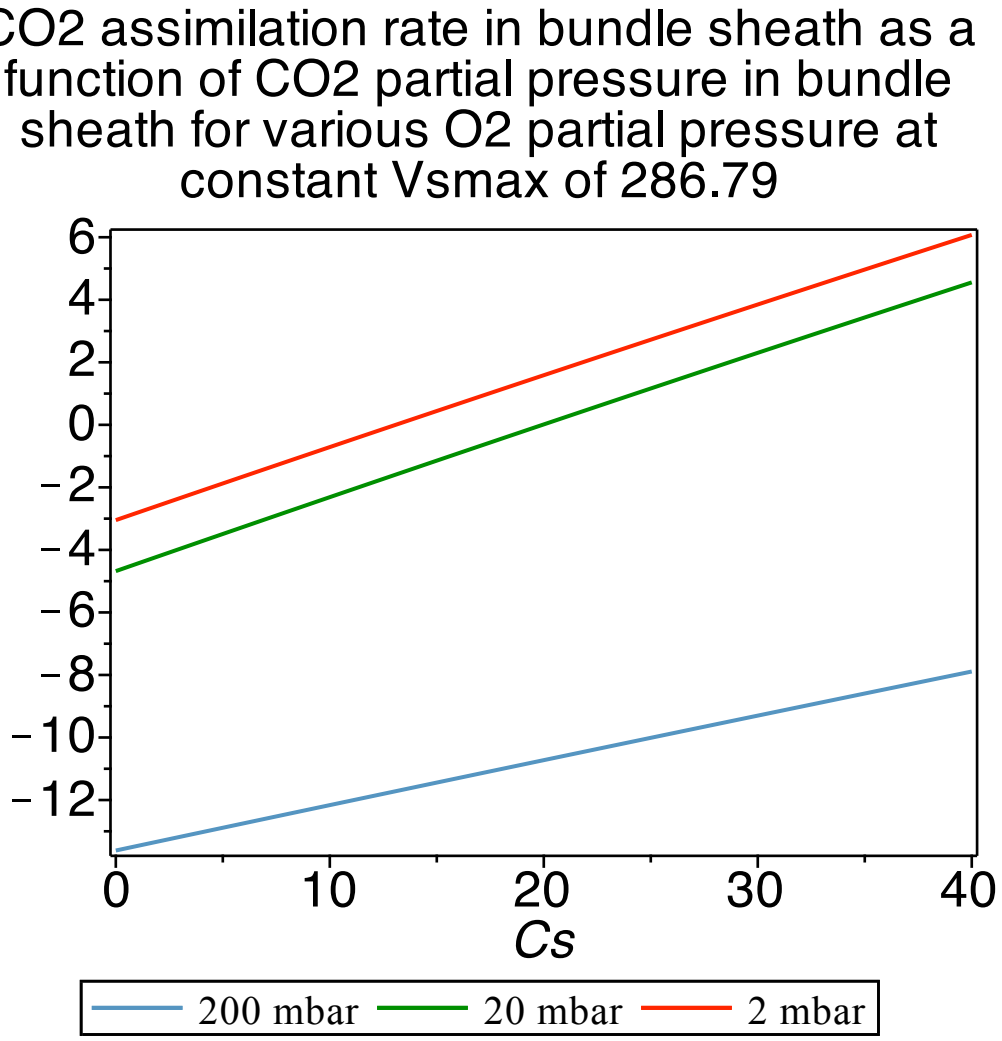
$$Ac3 := \frac{(Cs - 0.7640000000)\ Vsmax}{Cs + \dfrac{88935}{73}} - 0.01\ Vsmax \qquad (7)$$

> `with(plots):`

> `A3 := eval(Ac3, Vsmax = 286.79):`

> `p13 := plot((A2O1, Cs = 0..40), color = "SteelBlue", legend = ["200 mbar"], legendstyle = [font = ["HELVETICA", 15]], labelfont = ["HELVETICA", 15], axesfont = ["HELVETICA", 15]): p14 := plot((A2O2, Cs = 0..40), color = "Green", legend = ["20 mbar"], legendstyle = [font = ["HELVETICA", 15]], labelfont = ["HELVETICA",`

```
15], axesfont = ["HELVETICA", 15]) : p15 := plot((A3, Cs = 0..40), color = "Red",
legend = ["2 mbar"], legendstyle = [font = ["HELVETICA", 15]], labelfont
= ["HELVETICA", 15], axesfont = ["HELVETICA", 15]) :
> display((p13, p14, p15), axes = "boxed", title
= "CO2 assimilation rate in bundle sheath as a function of CO2 partial pressure in bundle
sheath for various O2 partial pressure at constant Vsmax of 286.79 ", titlefont
= ["HELVETICA", 15])
```




```
>
```