Corrigé XCAS des TD 1,2,3 & 4

Limites

$$\lim_{x=(+\infty)} \sqrt{1+x^2} - x = 0 \tag{1}$$

$$\lim_{x=0}(x^2)/(1-(\sqrt{1-(x^2)})) = 2 \tag{2}$$

$$\lim_{x=(+\infty)} x^{1/x} = 1 \tag{3}$$

$$\lim_{x=(+\infty)} (1+1/x)^x = e^1 \tag{4}$$

$$\lim_{x=(+\infty)} ((\log(x))/x)^{1/x} = 1 \tag{5}$$

$$\lim_{x=0} x^x = 1 \tag{6}$$

$$\lim_{x=0}(x^x)^x = 1 \tag{7}$$

$$\lim_{x=0} x^{x^x} = x \tag{8}$$

$$\lim_{x=0}(-(\log(x)))^x = 1 \tag{9}$$

Avec le programme branche ci-dessous, on étudie les branches paraboliques

```
branche(f)->
{ local a,b;
a:=limit((f(x))/x,x=(+(infinity)));
if (a==undef) return("pas d'asymptote") ;
if ((abs(a))==(+(infinity))) return("branche
parabolique x=0") ;
if (a==0) return("direction asymptotique y=0") ;
b:=limit(f(x)-a*x,x=(+(infinity)));
if (b==undef) return("direction asymptotique d'equation
y=("+a+")x") ;
if ((abs(b))==(+(infinity))) return("branche
parabolique de direction y=("+a+")x") ;
return("asymptote d'equation y=("+a+")x+"+b);
}
```

$$branche(\texttt{(x)->(x\^{}2-x+2)/(x-2)}) = \text{asymptote d'equation y=(1)x+1} \tag{10}$$

$$branche(\texttt{(x)->(x\^{}3)/(x-1)}) = \text{branche parabolique x=0} \tag{11}$$

$$branche(\texttt{(x)->sqrt(x\^{}2+x+1)}) = \text{asymptote d'equation y=(1)x+1/2} \tag{12}$$

$$branche(\texttt{(x)->x+sqrt(x\^{}2-1)}) = \text{asymptote d'equation y=(2)x+} \tag{13}$$

$$branche(\texttt{(x)->(sin(x))/x}) = \text{direction asymptotique y=0} \tag{14}$$

$$branche(\texttt{(x)->2*x-cos(x)}) = \text{direction asymptotique d'equation y=(2)x} \tag{15}$$

Dérivées

$$\frac{\partial\left((\cos(x))^{6}\right)}{\partial x} = (-(\sin(x)))6(\cos(x))^{5} \tag{16}$$

$$\frac{\partial\left(1/(\log(x))\right)}{\partial x} = \frac{(-(x)^{-1})}{(\log(x))^{2}} \tag{17}$$

$$\frac{\partial\left(e^{\sin(x)}\right)}{\partial x} = e^{\sin(x)}\cos(x) \tag{18}$$

$$\frac{\partial\left((x^{2}+x+3)^{3/2}\right)}{\partial x} = \frac{(2x+1)}{2(x^{2}+x+3)}\sqrt{x^{2}+x+3}(x^{2}+x+3)^{1} + \sqrt{x^{2}+x+3}(2x+1) \tag{19}$$

$$\frac{\partial\left(\log(\log(x))\right)}{\partial x} = \frac{1}{\log(x)x} \tag{20}$$

$$\frac{\partial\left((2\sqrt{x})/(1+x)\right)}{\partial x} = \frac{2}{2x}\frac{\sqrt{x}}{(1+x)} + 2\sqrt{x}(-((1+x)^{2})^{-1}) \tag{21}$$

$$\frac{\partial\left(\log((1+x)/(1-x))\right)}{\partial x} = (1+x)^{-1} - (-1+x)^{-1} \tag{22}$$

$$\lim_{x=2}(\sqrt{x+2}-2)/(x-2) = \frac{1}{8}\sqrt{4} \tag{23}$$

$$\lim_{x=0}(\log(1+x))/x = 1 \tag{24}$$

$$\lim_{x=0}(e^{x}-1)/x = 1 \tag{25}$$

$$\frac{\partial\left(cv^{2}e^{((-m)v^{2})/(2kT)}\right)}{\partial v} = c2ve^{\frac{(-m)v^{2}}{2kT}} + \frac{cv^{2}e^{\frac{(-m)v^{2}}{2kT}}(-m)2v}{2kT} \tag{26}$$

$$\text{solve}((c2ve^{(-m)(v^{2})/(2kT)} + cv^{2}e^{(-m)(v^{2})/(2kT)}(-m)2v/(2kT)) = 0, v) = [0, \frac{\sqrt{2mkT}}{m}, \frac{(-(\sqrt{2mkT}))}{m}] \tag{27}$$

```
(x)->2600*(1-0.51*exp((-0.075)*x))^3
```

```
(‘ x‘)->2600*(-(0.51*exp(-0.075*‘ x‘)*-0.075))*3*(1-0.51*exp(-0.075*‘ x‘))^2
```

$$Wp(0) = 71.633835 \tag{28}$$

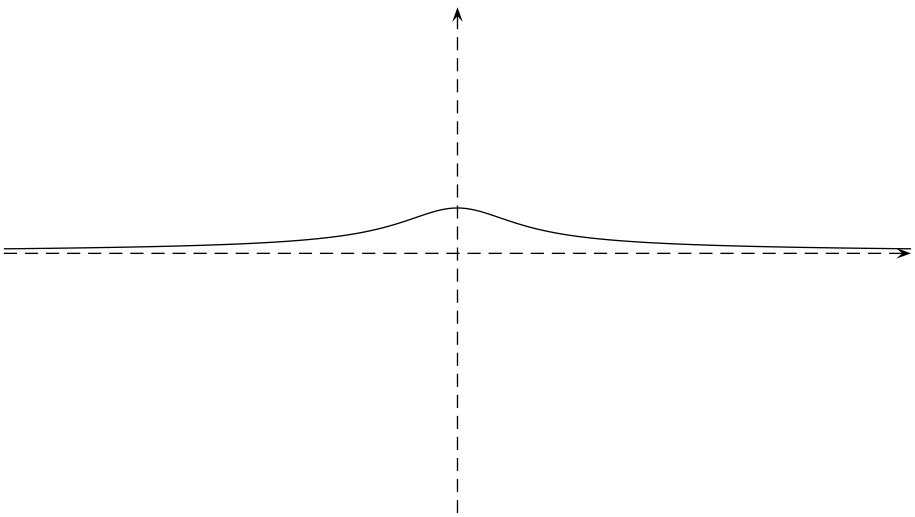
$$\lim_{x=(+\infty)} W(x) = 2600.000000 \tag{29}$$

```
(‘ x‘)->2600*(-(0.51*exp(-0.075*‘ x‘)*-0.075*-0.075))*3*(1-0.51*exp(-0.075*‘ x‘))^2+26
```

$$\text{solve}((Ws(x)) = 0,x) = [-8.977927,5.670236] \tag{30}$$

$$\text{solve}((5\cosh(x) - (4\sinh(x))) = 3,x) = [\log(3)] \tag{31}$$

$$\text{plotfunc}((\tanh(x))/x) \tag{32}$$



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$$\frac{\partial\left((2\sin(x)\sinh(x))/((\sinh(x)+\sin(x))^2)\right)}{\partial x} = \frac{2\cos(x)\sinh(x)}{(\sinh(x)+\sin(x))^2} + \frac{2\sin(x)\cosh(x)}{(\sinh(x)+\sin(x))^2} + 2\sin(x)\sinh(x)(\cos \tag{33}$$