Exporting data

Created using Maple 14.01

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```
> restart;
  with(StringTools) :
  FormatTime("%m−%d−%Y, %H:%M");
```
$$"08\text{-}06\text{-}2012, 22\text{:}06" \tag{1}$$

```
> S := n·R·( x/(2·J) ·coth( x/(2·J) ) − ((2·J+1)·x)/(2·J) ·coth( ((2·J+1)·x)/(2·J) )
```
$$+ \ln\left(\frac{\sinh\left(\frac{(2\cdot J+1)\cdot x}{2\cdot J} \right)}{\sinh\left(\frac{x}{2\cdot J} \right)} \right) \right);$$

$$x := \frac{g\cdot \mu B\cdot J\cdot B}{kB\cdot T};$$

$$S := n\,R\left(\frac{1}{2}\, \frac{x\,\coth\left(\frac{1}{2}\, \frac{x}{J} \right)}{J} - \frac{1}{2}\, \frac{(2\,J+1)\,x\,\coth\left(\frac{1}{2}\, \frac{(2\,J+1)\,x}{J} \right)}{J}\right.$$

$$\left. + \ln\left(\frac{\sinh\left(\frac{1}{2}\, \frac{(2\,J+1)\,x}{J} \right)}{\sinh\left(\frac{1}{2}\, \frac{x}{J} \right)} \right) \right)$$

$$x := \frac{g\,\mu B\,J\,B}{kB\,T} \tag{2}$$

```
> g := 2 :
  μB := 9.27e−24 :
  J := 5/2 :
  kB := 1.38e−23 :
  B := 1 :
  ρ := 1.71 :
  V := 10 :
  m := 482 :
  n := ρ·V/m :
  R := 8.31 :
  S;
```

$$\frac{0.1980390087 \coth\left(\dfrac{0.6717391305}{T}\right)}{T} - \frac{1.188234052 \coth\left(\dfrac{4.030434782}{T}\right)}{T}$$

$$+\ 0.2948153527 \ln\left(\frac{\sinh\left(\dfrac{4.030434782}{T}\right)}{\sinh\left(\dfrac{0.6717391305}{T}\right)}\right)$$

(3)

Now the *seq* function is used to generature a table of data containing the temperature and entropy values. Notice that S approaches zero in the low-temperature limit as expected.

> $Sdata := [\,seq(\,[T, S], T = 0.1\,..10, .1\,)\,];$

$Sdata := [\,[0.1, 0.000006226500249], [0.2, 0.002755409146], [0.3, 0.01852745268], [0.4,$ (4)
$0.04611696856], [0.5, 0.07866582555], [0.6, 0.1119354126], [0.7, 0.1440293852], [0.8,$
$0.1742145533], [0.9, 0.2022598979], [1.0, 0.2281410473], [1.1, 0.2519191747], [1.2,$
$0.2736934421], [1.3, 0.2935818523], [1.4, 0.3117122132], [1.5, 0.3282165925], [1.6,$
$0.3432271896], [1.7, 0.3568730962], [1.8, 0.3692778890], [1.9, 0.3805579534], [2.0,$
$0.3908214782], [2.1, 0.4001679928], [2.2, 0.4086883066], [2.3, 0.4164647481], [2.4,$
$0.4235715915], [2.5, 0.4300756017], [2.6, 0.4360366311], [2.7, 0.4415082416], [2.8,$
$0.4465383056], [2.9, 0.4511695865], [3.0, 0.4554402750], [3.1, 0.4593844849], [3.2,$
$0.4630326984], [3.3, 0.4664121777], [3.4, 0.4695473184], [3.5, 0.4724599794], [3.6,$
$0.4751697638], [3.7, 0.4776942765], [3.8, 0.4800493453], [3.9, 0.4822492209], [4.0,$
$0.4843067508], [4.1, 0.4862335325], [4.2, 0.4880400513], [4.3, 0.4897358015], [4.4,$
$0.4913293878], [4.5, 0.4928286233], [4.6, 0.4942406110], [4.7, 0.4955718173], [4.8,$
$0.4968281355], [4.9, 0.4980149486], [5.0, 0.4991371730], [5.1, 0.5001993102], [5.2,$
$0.5012054846], [5.3, 0.5021594811], [5.4, 0.5030647768], [5.5, 0.5039245678], [5.6,$
$0.5047418003], [5.7, 0.5055191895], [5.8, 0.5062592383], [5.9, 0.5069642635], [6.0,$
$0.5076364066], [6.1, 0.5082776500], [6.2, 0.5088898314], [6.3, 0.5094746560], [6.4,$
$0.5100337079], [6.5, 0.5105684590], [6.6, 0.5110802809], [6.7, 0.5115704477], [6.8,$
$0.5120401504], [6.9, 0.5124904995], [7.0, 0.5129225310], [7.1, 0.5133372157], [7.2,$
$0.5137354569], [7.3, 0.5141181072], [7.4, 0.5144859584], [7.5, 0.5148397583], [7.6,$
$0.5151802067], [7.7, 0.5155079600], [7.8, 0.5158236364], [7.9, 0.5161278163], [8.0,$
$0.5164210470], [8.1, 0.5167038425], [8.2, 0.5169766888], [8.3, 0.5172400429], [8.4,$
$0.5174943377], [8.5, 0.5177399784], [8.6, 0.5179773531], [8.7, 0.5182068241], [8.8,$
$0.5184287369], [8.9, 0.5186434168], [9.0, 0.5188511731], [9.1, 0.5190522979], [9.2,$
$0.5192470689], [9.3, 0.5194357495], [9.4, 0.5196185887], [9.5, 0.5197958237], [9.6,$
$0.5199676807], [9.7, 0.5201343735], [9.8, 0.5202961056], [9.9, 0.5204530706], [10.0,$
$0.5206054527]\,]$

Now the *writedata* command is used to export the table of data stored in *Sdata* to the file "entropy export.dat". The file will be created in the specified directory. Notice the awkward \\ syntax. The file will contain two columns, both a floating point decimal numbers.

> $writedata(\text{"D:\\Jake's\\UBCO\\2012-2013\\Maple tutorials\\entropy export.dat"}, Sdata, float,$
> $float\,);$

>