

> # Varmelikninga , Exercise # 8, side 927

Randbetingelsen er: isolert i venstre endepunkt av staven, og temperaturen i høgre endepunkt er ein oppgitt periodisk funksjon av tida

```
> Digits := 6;
                                     Digits := 6 (1)
```

```
>
> u := array(0..5, 0..40)
                                     u := array(0..5, 0..40, [ ]) (2)
```

```
> for j from 0 to 40 do u5,j := evalf( sin( (50/3) · Pi · 0.01 · j ) ) end do:
> for i from 0 to 5 do ui,0 := 0 end do:
> for j from 1 to 40 do u0,j := (1 - 2·r) · u0,j-1 + 2·r · u1,j-1 end do:
>
>
>
> r := 0.25
                                     r := 0.25 (3)
```

```
> for j from 1 to 40 do print("j = ", j); for i from 1 to 4 do ui,j := (1 - 2·r) · ui,j-1 + r
· (ui+1,j-1 + ui-1,j-1); print(ui,j) end do end do;
                                     "j = ", 1
                                     0.
                                     0.
                                     0.
                                     0.
                                     "j = ", 2
                                     0.
                                     0.
                                     0.
                                     0.125000
                                     "j = ", 3
                                     0.
                                     0.
                                     0.0312500
                                     0.279007
                                     "j = ", 4
                                     0.
                                     0.00781250
                                     0.0853768
                                     0.397316
                                     "j = ", 5
                                     0.00195312
```

0.0252504  
0.143970  
0.436508  
"j = ", 6  
0.00728916  
0.0491060  
0.187425  
0.379245  
"j = ", 7  
0.0161652  
0.0732315  
0.200800  
0.236478  
"j = ", 8  
0.0274237  
0.0908570  
0.177828  
0.0434372  
"j = ", 9  
0.0389633  
0.0967415  
0.122488  
-0.150333  
"j = ", 10  
0.0483636  
0.0887336  
0.0478461  
-0.294544  
"j = ", 11  
0.0535838  
0.0684192  
-0.0275295  
-0.351816  
"j = ", 12  
0.0535514  
0.0407232  
-0.0846140  
-0.307788  
"j = ", 13  
0.0484819  
0.0125960  
-0.109073

-0.175048  
"j = ", 14  
0.0398466  
-0.00884980  
-0.0951495  
0.0102090  
"j = ", 15  
0.0299994  
-0.0182506  
-0.0472350  
0.197826  
"j = ", 16  
0.0215622  
-0.0134342  
0.0212763  
0.337104  
"j = ", 17  
0.0167350  
0.00399250  
0.0915557  
0.390378  
"j = ", 18  
0.0167172  
0.0290690  
0.144370  
0.343076  
"j = ", 19  
0.0213935  
0.0548063  
0.165221  
0.207625  
"j = ", 20  
0.0293718  
0.0740567  
0.148218  
0.0201165  
"j = ", 21  
0.0383610  
0.0814259  
0.0976523  
-0.169397  
"j = ", 22

0.0457890  
0.0747162  
0.0268334  
-0.310286  
"j = ", 23  
0.0494947  
0.0555137  
-0.0454758  
-0.364938  
"j = ", 24  
0.0483100  
0.0287615  
-0.100094  
-0.318832  
"j = ", 25  
0.0423743  
0.0014348  
-0.122564  
-0.184432  
"j = ", 26  
0.0330991  
-0.0193300  
-0.107031  
0.0021498  
"j = ", 27  
0.0227905  
-0.0281480  
-0.0578106  
0.190827  
"j = ", 28  
0.0140323  
-0.0228290  
0.0117645  
0.330960  
"j = ", 29  
0.00899475  
-0.00496530  
0.0829150  
0.384923  
"j = ", 30  
0.00885300  
0.0204948

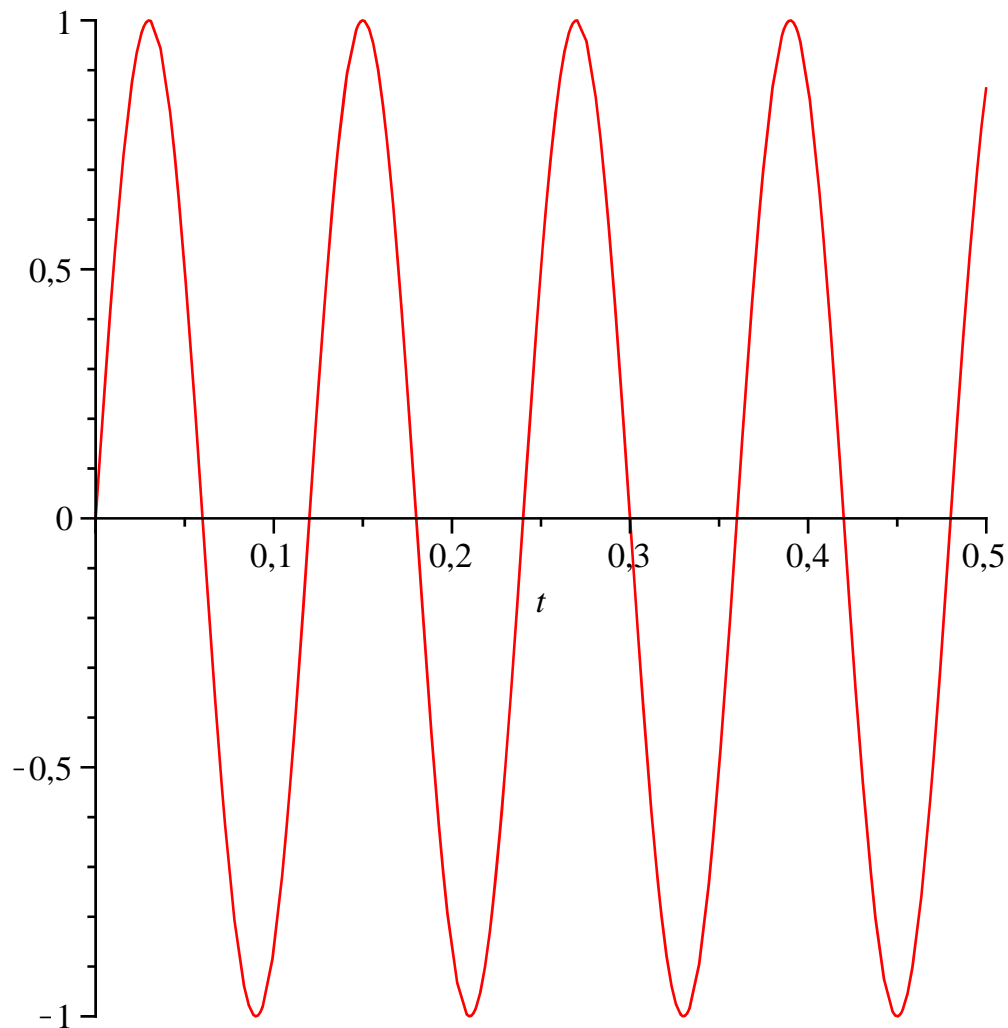
0.136447  
0.338183  
"j = ", 31  
0.0134730  
0.0465724  
0.157893  
0.203194  
"j = ", 32  
0.0214476  
0.0661277  
0.141388  
0.0160620  
"j = ", 33  
0.0304738  
0.0737728  
0.0912414  
-0.173133  
"j = ", 34  
0.0379701  
0.0673152  
0.0207807  
-0.313756  
"j = ", 35  
0.0417681  
0.0483453  
-0.0512198  
-0.368184  
"j = ", 36  
0.0406937  
0.0218097  
-0.105570  
-0.321888  
"j = ", 37  
0.0348819  
-0.0053143  
-0.127804  
-0.187326  
"j = ", 38  
0.0257405  
-0.0258876  
-0.112062  
-0.0006042

```
"j = ", 39
0.0155726
-0.0345242
-0.0626540
0.188195
"j = ", 40
0.00695995
-0.0290325
0.0070908
0.328434
```

(4)

```
> # La oss samanlikne disse gitterpunkt verdiane av  $u(x,t)$  med dei kjende verdiane  $u_{5,j}$  av  $u$  når  $x = 1$  :
```

```
> plot( $\sin\left(\frac{50}{3} \cdot \text{Pi} \cdot t\right)$ ,  $t = 0..0.5$ );
```



```
> for j from 1 to 40 do print( $u_{5,j}$ ) end do
```

```
0.500000
```

0.866027  
1.  
0.866023  
0.499995  
0.  
-0.500007  
-0.866035  
-1.  
-0.866024  
-0.499988  
0.  
0.500005  
0.866034  
1.  
0.866026  
0.499991  
-0.0000220392  
-0.500003  
-0.866038  
-1.  
-0.866012  
-0.499976  
0.0000293856  
0.500027  
0.866041  
1.  
0.866008  
0.499969  
-0.0000367321  
-0.500033  
-0.866045  
-1.  
-0.866005  
-0.499963  
0.0000440785  
0.500039  
0.866049  
1.  
0.866001

