$SPAD/src/input richintfunc000-032.input

Albert Rich and Timothy Daly

July 14, 2013

Abstract

Contents

```
           __ * __

)set break resume
)sys rm -f richintfunc000-032.output
)spool richintfunc000-032.output
)set message auto off
)clear all

--S 1 of 165
t0000:= x^m*Ei(b*x)
--R
--R
--R                m
--R   (1)  Ei(b x)x
--R                                                    Type: Expression(Integer)
--E 1

--S 2 of 165
r0000:= -1/b/(1+m)*(-x^(1+m)*Ei(b*x)*b+x^m*(-b*x)^(-m)*Gamma(1+m,-b*x))
--R
--R
--R                 - m m _                            m + 1
--R        - (- b x)   x | (m + 1,- b x) + b Ei(b x)x
--R   (2)  ------------------------------------------------
--R                            b m + b
--R                                                    Type: Expression(Integer)
--E 2

--S 3 of 165
--a0000:= integrate(t0000,x)
--E 3

--S 4 of 165
--m0000:= a0000-r0000
--E 4

--S 5 of 165
--d0000:= D(m0000,x)
--E 5

--S 6 of 165
t0001:= exp(1)^(b*x)*Ei(b*x)/x^3
--R
--R
--R                 b x
--R        Ei(b x)%e
--R   (3)  ------------
--R               3
--R              x
```

```
--R                                                    Type: Expression(Integer)
--E 6

--S 7 of 165
r0001:= -1/4*(exp(2*b*x)+4*exp(2*b*x)*b*x+2*Ei(b*x)*exp(b*x)+_
        2*Ei(b*x)*exp(b*x)*b*x-x^2*Ei(b*x)^2*b^2-8*b^2*Ei(2*b*x)*x^2)/x^2
--R
--R
--R   (4)
--R                 2b x                          b x     2 2            2 2       2
--R   (- 4b x - 1)%e     + (- 2b x - 2)Ei(b x)%e    + 8b x Ei(2b x) + b x Ei(b x)
--R   ------------------------------------------------------------------------------
--R                                       2
--R                                     4x
--R                                                    Type: Expression(Integer)
--E 7

--S 8 of 165
--a0001:= integrate(t0001,x)
--E 8

--S 9 of 165
--m0001:= a0001-r0001
--E 9

--S 10 of 165
--d0001:= D(m0001,x)
--E 10

--S 11 of 165
t0002:= exp(1)^(b*x)*Ei(b*x)/x^2
--R
--R
--R                 b x
--R        Ei(b x)%e
--R   (5)  ------------
--R              2
--R             x
--R                                                    Type: Expression(Integer)
--E 11

--S 12 of 165
r0002:= -1/2*(2*exp(2*b*x)+2*Ei(b*x)*exp(b*x)-x*Ei(b*x)^2*b-4*b*Ei(2*b*x)*x)/x
--R
--R
--R             2b x             b x                              2
--R        - 2%e     - 2Ei(b x)%e    + 4b x Ei(2b x) + b x Ei(b x)
--R   (6)  ------------------------------------------------------------
--R                                   2x
--R                                                    Type: Expression(Integer)
```

```
--E 12

--S 13 of 165
--a0002:= integrate(t0002,x)
--E 13

--S 14 of 165
--m0002:= a0002-r0002
--E 14

--S 15 of 165
--d0002:= D(m0002,x)
--E 15

--S 16 of 165
t0003:= x*exp(1)^(a+b*x)*Ei(c+d*x)
--R
--R
--R                        b x + a
--R   (7)  x Ei(d x + c)%e
--R                                                    Type: Expression(Integer)
--E 16

--S 17 of 165
r0003:= -exp(1)^(a+c+(b+d)*x)/b/(b+d)-exp(1)^(a+b*x)*(1-b*x)*Ei(c+d*x)/b^2+_
        (b*c+d)*exp(1)^(a-b*c/d)*Ei((b+d)*(c+d*x)/d)/b^2/d
--R
--R
--R   (8)
--R               (d + b)x + c + a        2    2       2                    b x + a
--R       - b d %e                 + ((b d  + b d)x - d  - b d)Ei(d x + c)%e
--R     +
--R                                                            a d - b c
--R                                    2                       ---------
--R         2                 2     (d  + b d)x + c d + b c       d
--R       (d  + (b c + b)d + b c)Ei(-----------------------)%e
--R                                           d
--R  /
--R      2 2    3
--R     b d  + b d
--R                                                    Type: Expression(Integer)
--E 17

--S 18 of 165
--a0003:= integrate(t0003,x)
--E 18

--S 19 of 165
--m0003:= a0003-r0003
--E 19
```

```
--S 20 of 165
--d0003:= D(m0003,x)
--E 20

--S 21 of 165
t0004:= x^2*exp(1)^(a+b*x)*Ei(c+d*x)
--R
--R
--R         2             b x + a
--R   (9)  x Ei(d x + c)%e
--R                                                    Type: Expression(Integer)
--E 21

--S 22 of 165
r0004:= exp(1)^(a+c+(b+d)*x)/b/(b+d)^2+2*exp(1)^(a+c+(b+d)*x)/b^2/(b+d)+_
        c*exp(1)^(a+c+(b+d)*x)/b/d/(b+d)-exp(1)^(a+c+(b+d)*x)*_
        x/b/(b+d)+exp(1)^(a+b*x)*(2-2*b*x+b^2*x^2)*Ei(c+d*x)/b^3-_
        (b^2*c^2+2*b*c*d+2*d^2)*exp(1)^(a-b*c/d)*Ei((b+d)*(c+d*x)/d)/b^3/d^2
--R
--R
--R   (10)
--R            2 3    3 2         3     2      2  2    3      (d + b)x + c + a
--R       ((- b d  - b d )x + 2b d  + (b c + 3b )d  + b c d)%e
--R     +
--R              2 4     3 3    4 2  2          4     2 3     3 2       4       3
--R           (b d  + 2b d  + b d )x  + (- 2b d  - 4b d  - 2b d )x + 2d  + 4b d
--R         +
--R             2 2
--R           2b d
--R      *
--R                       b x + a
--R         Ei(d x + c)%e
--R     +
--R               4                 3       2 2     2      2  2        3 2     3
--R           - 2d  + (- 2b c - 4b)d  + (- b c  - 4b c - 2b )d  + (- 2b c  - 2b c)d
--R         +
--R              4 2
--R           - b c
--R      *
--R                                      a d - b c
--R              2                       ---------
--R            (d  + b d)x + c d + b c       d
--R         Ei(-----------------------)%e
--R                        d
--R  /
--R      3 4     4 3    5 2
--R     b d  + 2b d  + b d
--R                                                    Type: Expression(Integer)
--E 22
```

```
--S 23 of 165
--a0004:= integrate(t0004,x)
--E 23

--S 24 of 165
--m0004:= a0004-r0004
--E 24

--S 25 of 165
--d0004:= D(m0004,x)
--E 25

--S 26 of 165
t0005:= x^m*Si(b*x)
--R
--R
--R                 m
--R   (11)  Si(b x)x
--R                                                    Type: Expression(Integer)
--E 26

--S 27 of 165
r0005:= 1/2*(x^m*(-%i*b*x)^(-m)*Gamma(1+m,-%i*b*x)+x^m*(%i*b*x)^(-m)*_
        Gamma(1+m,%i*b*x)+2*x^(1+m)*Si(b*x)*b)/b/(1+m)
--R
--R
--R   (12)
--R        m        - m _                              - m m _
--R       x (%i b x)   | (m + 1,%i b x) + (- %i b x)   x | (m + 1,- %i b x)
--R     +
--R                  m + 1
--R       2b Si(b x)x
--R  /
--R     2b m + 2b
--R                                            Type: Expression(Complex(Integer))
--E 27

--S 28 of 165
--a0005:= integrate(t0005,x)
--E 28

--S 29 of 165
--m0005:= a0005-r0005
--E 29

--S 30 of 165
--d0005:= D(m0005,x)
--E 30
```

```
--S 31 of 165
t0006:= sin(b*x)*Si(b*x)/x^3
--R
--R
--R         Si(b x)sin(b x)
--R   (13)  ---------------
--R                 3
--R                x
--R                                                    Type: Expression(Integer)
--E 31

--S 32 of 165
r0006:= -1/4*(-4*b^2*Ci(2*b*x)*x^2+2*x*cos(b*x)*sin(b*x)*b+1-_
        cos(b*x)^2+x*b*sin(2*b*x)+2*x*cos(b*x)*Si(b*x)*b+2*sin(b*x)*Si(b*x)+_
        x^2*Si(b*x)^2*b^2)/x^2
--R
--R
--R   (14)
--R                                                                        2
--R       - b x sin(2b x) + (- 2b x cos(b x) - 2Si(b x))sin(b x) + cos(b x)
--R     +
--R                                  2 2       2     2 2
--R       - 2b x Si(b x)cos(b x) - b x Si(b x)  + 4b x Ci(2b x) - 1
--R  /
--R       2
--R     4x
--R                                                    Type: Expression(Integer)
--E 32

--S 33 of 165
a0006:= integrate(t0006,x)
--R
--R
--R            x
--R          ++  Si(%A b)sin(%A b)
--R   (15)   |   ----------------- d%A
--R         ++            3
--R                      %A
--R                                          Type: Union(Expression(Integer),...)
--E 33

--S 34 of 165
--m0006:= a0006-r0006
--E 34

--S 35 of 165
--d0006:= D(m0006,x)
--E 35

--S 36 of 165
```

```
t0007:= x*sin(a+b*x)*Si(c+d*x)
--R
--R
--R   (16)  x Si(d x + c)sin(b x + a)
--R                                                    Type: Expression(Integer)
--E 36

--S 37 of 165
r0007:= 1/2*cos(a-c+(b-d)*x)/b/(b-d)-1/2*cos(a+c+(b+d)*x)/b/(b+d)-_
        1/2*cos(a-b*c/d)*Ci((b-d)*(c+d*x)/d)/b^2+_
        1/2*cos(a-b*c/d)*Ci((b+d)*(c+d*x)/d)/b^2+_
        1/2*c*Ci((b-d)*(c+d*x)/d)*sin(a-b*c/d)/b/d-_
        1/2*c*Ci((b+d)*(c+d*x)/d)*sin(a-b*c/d)/b/d-x*cos(a+b*x)*Si(c+d*x)/b+_
        sin(a+b*x)*Si(c+d*x)/b^2+1/2*c*cos(a-b*c/d)*Si((b-d)*(c+d*x)/d)/b/d+_
        1/2*sin(a-b*c/d)*Si((b-d)*(c+d*x)/d)/b^2-_
        1/2*c*cos(a-b*c/d)*Si((b+d)*(c+d*x)/d)/b/d-_
        1/2*sin(a-b*c/d)*Si((b+d)*(c+d*x)/d)/b^2
--R
--R
--R   (17)
--R          3     2
--R       (2d  - 2b d)Si(d x + c)sin(b x + a)
--R     +
--R                            2
--R               3    2     (d  + b d)x + c d + b c
--R           (- d  + b d)Si(-----------------------)
--R                                    d
--R         +
--R                            2
--R               3    2     (d  - b d)x + c d - b c
--R           (- d  + b d)Si(-----------------------)
--R                                    d
--R         +
--R                              2
--R                   2    3     (d  + b d)x + c d + b c
--R           (- b c d  + b c)Ci(-----------------------)
--R                                      d
--R         +
--R                              2
--R                 2    3     (- d  + b d)x - c d + b c
--R           (b c d  - b c)Ci(-------------------------)
--R                                      d
--R      *
--R             a d - b c
--R         sin(---------)
--R                 d
--R     +
--R             2    2                                 2    2
--R       (- b d  + b d)cos((d + b)x + c + a) + (- b d  - b d)cos((d - b)x + c - a)
--R     +
```

```
--R              3     3
--R       (- 2b d  + 2b d)x Si(d x + c)cos(b x + a)
--R     +
--R                                2
--R                   2    3     (d  + b d)x + c d + b c
--R           (- b c d  + b c)Si(-----------------------)
--R                                      d
--R         +
--R                                2
--R                   2    3     (d  - b d)x + c d - b c
--R           (- b c d  + b c)Si(-----------------------)
--R                                      d
--R         +
--R                         2
--R             3    2     (d  + b d)x + c d + b c
--R           (d  - b d)Ci(-----------------------)
--R                                   d
--R         +
--R                              2
--R               3    2     (- d  + b d)x - c d + b c
--R           (- d  + b d)Ci(-------------------------)
--R                                      d
--R      *
--R             a d - b c
--R         cos(---------)
--R                 d
--R  /
--R       2 3     4
--R     2b d  - 2b d
--R                                                    Type: Expression(Integer)
--E 37

--S 38 of 165
a0007:= integrate(t0007,x)
--R
--R
--R            x
--R          ++
--R   (18)   |   %A Si(%A d + c)sin(%A b + a)d%A
--R         ++
--R                                          Type: Union(Expression(Integer),...)
--E 38

--S 39 of 165
--m0007:= a0007-r0007
--E 39

--S 40 of 165
--d0007:= D(m0007,x)
--E 40
```

```
--S 41 of 165
t0008:= cos(b*x)*Si(b*x)/x^2
--R
--R
--R         Si(b x)cos(b x)
--R   (19)  ---------------
--R                  2
--R                 x
--R                                                    Type: Expression(Integer)
--E 41

--S 42 of 165
r0008:= -1/2*(-2*b*Ci(2*b*x)*x+sin(2*b*x)+2*cos(b*x)*Si(b*x)+x*Si(b*x)^2*b)/x
--R
--R
--R                                                          2
--R         - sin(2b x) - 2Si(b x)cos(b x) - b x Si(b x)  + 2b x Ci(2b x)
--R   (20)  ------------------------------------------------------------
--R                                      2x
--R                                                    Type: Expression(Integer)
--E 42

--S 43 of 165
a0008:= integrate(t0008,x)
--R
--R
--R            x
--R          ++  Si(%A b)cos(%A b)
--R   (21)   |   ----------------- d%A
--R         ++            2
--R                      %A
--R                                          Type: Union(Expression(Integer),...)
--E 43

--S 44 of 165
--m0008:= a0008-r0008
--E 44

--S 45 of 165
--d0008:= D(m0008,x)
--E 45

--S 46 of 165
t0009:= x*cos(a+b*x)*Si(c+d*x)
--R
--R
--R   (22)  x Si(d x + c)cos(b x + a)
--R                                                    Type: Expression(Integer)
--E 46
```

```
--S 47 of 165
r0009:= 1/2*c*cos(a-b*c/d)*Ci((b-d)*(c+d*x)/d)/b/d-_
        1/2*c*cos(a-b*c/d)*Ci((b+d)*(c+d*x)/d)/b/d+_
        1/2*Ci((b-d)*(c+d*x)/d)*sin(a-b*c/d)/b^2-_
        1/2*Ci((b+d)*(c+d*x)/d)*sin(a-b*c/d)/b^2-_
        1/2*sin(a-c+(b-d)*x)/b/(b-d)+1/2*sin(a+c+(b+d)*x)/b/_
        (b+d)+cos(a+b*x)*Si(c+d*x)/b^2+x*sin(a+b*x)*Si(c+d*x)/b+_
        1/2*cos(a-b*c/d)*Si((b-d)*(c+d*x)/d)/b^2-_
        1/2*c*sin(a-b*c/d)*Si((b-d)*(c+d*x)/d)/b/d-_
        1/2*cos(a-b*c/d)*Si((b+d)*(c+d*x)/d)/b^2+_
        1/2*c*sin(a-b*c/d)*Si((b+d)*(c+d*x)/d)/b/d
--R
--R
--R   (23)
--R           2    2                                  2    2
--R       (b d  - b d)sin((d + b)x + c + a) + (- b d  - b d)sin((d - b)x + c - a)
--R     +
--R            3     3
--R       (2b d  - 2b d)x Si(d x + c)sin(b x + a)
--R     +
--R                              2
--R                 2    3     (d  + b d)x + c d + b c
--R           (b c d  - b c)Si(-----------------------)
--R                                      d
--R         +
--R                              2
--R                 2    3     (d  - b d)x + c d - b c
--R           (b c d  - b c)Si(-----------------------)
--R                                      d
--R         +
--R                            2
--R               3    2     (d  + b d)x + c d + b c
--R           (- d  + b d)Ci(-----------------------)
--R                                    d
--R         +
--R                            2
--R             3    2     (- d  + b d)x - c d + b c
--R           (d  - b d)Ci(-------------------------)
--R                                   d
--R      *
--R             a d - b c
--R         sin(---------)
--R                 d
--R     +
--R          3     2
--R       (2d  - 2b d)Si(d x + c)cos(b x + a)
--R     +
--R                              2
--R               3    2     (d  + b d)x + c d + b c
```

```
--R           (- d  + b d)Si(-----------------------)
--R                                    d
--R         +
--R                              2
--R              3    2     (d  - b d)x + c d - b c
--R           (- d  + b d)Si(-----------------------)
--R                                    d
--R         +
--R                                 2
--R                   2    3     (d  + b d)x + c d + b c
--R           (- b c d  + b c)Ci(-----------------------)
--R                                      d
--R         +
--R                                 2
--R                 2    3     (- d  + b d)x - c d + b c
--R           (b c d  - b c)Ci(-------------------------)
--R                                      d
--R      *
--R             a d - b c
--R         cos(---------)
--R                 d
--R  /
--R       2 3     4
--R     2b d  - 2b d
--R                                                    Type: Expression(Integer)
--E 47

--S 48 of 165
a0009:= integrate(t0009,x)
--R
--R
--R            x
--R          ++
--R   (24)   |   %A Si(%A d + c)cos(%A b + a)d%A
--R         ++
--R                                          Type: Union(Expression(Integer),...)
--E 48

--S 49 of 165
--m0009:= a0009-r0009
--E 49

--S 50 of 165
--d0009:= D(m0009,x)
--E 50

--S 51 of 165
t0010:= x^m*Ci(b*x)
--R
--R
```

```
--R                 m
--R   (25)  Ci(b x)x
--R                                                    Type: Expression(Integer)
--E 51

--S 52 of 165
r0010:= 1/2*(%i*x^m*(-%i*b*x)^(-m)*Gamma(1+m,-%i*b*x)-%i*x^m*(%i*b*x)^(-m)*_
        Gamma(1+m,%i*b*x)+2*x^(1+m)*Ci(b*x)*b)/b/(1+m)
--R
--R
--R   (26)
--R              m        - m _                                  - m m _
--R       - %i x (%i b x)   | (m + 1,%i b x) + %i (- %i b x)   x | (m + 1,- %i b x)
--R     +
--R                   m + 1
--R       2b Ci(b x)x
--R  /
--R     2b m + 2b
--R                                          Type: Expression(Complex(Integer))
--E 52

--S 53 of 165
a0010:= integrate(t0010,x)
--R
--R
--R   >> Error detected within library code:
--R   Function not supported by Risch d.e.
--R
--R   Continuing to read the file...
--R
--E 53

--S 54 of 165
--m0010:= a0010-r0010
--E 54

--S 55 of 165
--d0010:= D(m0010,x)
--E 55

--S 56 of 165
t0011:= Ci(b*x)*sin(b*x)/x^2
--R
--R
--R         Ci(b x)sin(b x)
--R   (27)  ---------------
--R                 2
--R                x
--R                                                    Type: Expression(Integer)
--E 56
```

```
--S 57 of 165
r0011:= -1/2*(-x*Ci(b*x)^2*b-2*b*Ci(2*b*x)*x+2*sin(b*x)*Ci(b*x)+sin(2*b*x))/x
--R
--R
--R                                                                        2
--R         - sin(2b x) - 2Ci(b x)sin(b x) + 2b x Ci(2b x) + b x Ci(b x)
--R   (28)  ------------------------------------------------------------
--R                                      2x
--R                                                    Type: Expression(Integer)
--E 57

--S 58 of 165
a0011:= integrate(t0011,x)
--R
--R
--R            x
--R          ++  Ci(%A b)sin(%A b)
--R   (29)   |   ----------------- d%A
--R         ++            2
--R                      %A
--R                                          Type: Union(Expression(Integer),...)
--E 58

--S 59 of 165
--m0011:= a0011-r0011
--E 59

--S 60 of 165
--d0011:= D(m0011,x)
--E 60

--S 61 of 165
t0012:= x*sin(a+b*x)*Ci(c+d*x)
--R
--R
--R   (30)  x Ci(d x + c)sin(b x + a)
--R                                                    Type: Expression(Integer)
--E 61

--S 62 of 165
r0012:= -x*cos(a+b*x)*Ci(c+d*x)/b-1/2*c*cos(a-b*c/d)*Ci((b-d)*(c+d*x)/d)/b/d-_
        1/2*c*cos(a-b*c/d)*Ci((b+d)*(c+d*x)/d)/b/d-1/2*Ci((b-d)*(c+d*x)/d)*_
        sin(a-b*c/d)/b^2-1/2*Ci((b+d)*(c+d*x)/d)*sin(a-b*c/d)/b^2+Ci(c+d*x)*_
        sin(a+b*x)/b^2+1/2*sin(a-c+(b-d)*x)/b/(b-d)+1/2*sin(a+c+(b+d)*x)/_
        b/(b+d)-1/2*cos(a-b*c/d)*Si((b-d)*(c+d*x)/d)/b^2+1/2*c*sin(a-b*c/d)*_
        Si((b-d)*(c+d*x)/d)/b/d-1/2*cos(a-b*c/d)*Si((b+d)*(c+d*x)/d)/b^2+_
        1/2*c*sin(a-b*c/d)*Si((b+d)*(c+d*x)/d)/b/d
--R
--R
```

```
--R   (31)
--R           2    2                                2    2
--R       (b d  - b d)sin((d + b)x + c + a) + (b d  + b d)sin((d - b)x + c - a)
--R     +
--R           3     2
--R       (2d  - 2b d)Ci(d x + c)sin(b x + a)
--R     +
--R                                2
--R                 2    3     (d  + b d)x + c d + b c
--R           (b c d  - b c)Si(-----------------------)
--R                                     d
--R         +
--R                               2
--R                   2    3     (d  - b d)x + c d - b c
--R           (- b c d  + b c)Si(-----------------------)
--R                                        d
--R         +
--R                            2
--R                3    2     (d  + b d)x + c d + b c
--R           (- d  + b d)Ci(-----------------------)
--R                                     d
--R         +
--R                             2
--R                3    2     (- d  + b d)x - c d + b c
--R           (- d  + b d)Ci(-------------------------)
--R                                      d
--R      *
--R             a d - b c
--R         sin(---------)
--R                 d
--R     +
--R               3     3
--R       (- 2b d  + 2b d)x Ci(d x + c)cos(b x + a)
--R     +
--R                             2
--R                3    2     (d  + b d)x + c d + b c
--R           (- d  + b d)Si(-----------------------)
--R                                     d
--R         +
--R                           2
--R             3    2     (d  - b d)x + c d - b c
--R           (d  - b d)Si(-----------------------)
--R                                  d
--R         +
--R                               2
--R                   2    3     (d  + b d)x + c d + b c
--R           (- b c d  + b c)Ci(-----------------------)
--R                                        d
--R         +
--R                                  2
```

```
--R                   2    3     (- d  + b d)x - c d + b c
--R           (- b c d  + b c)Ci(-------------------------)
--R                                          d
--R      *
--R             a d - b c
--R         cos(---------)
--R                 d
--R  /
--R       2 3     4
--R     2b d  - 2b d
--R                                                  Type: Expression(Integer)
--E 62

--S 63 of 165
a0012:= integrate(t0012,x)
--R
--R
--R            x
--R          ++
--R   (32)   |   %A Ci(%A d + c)sin(%A b + a)d%A
--R         ++
--R                                          Type: Union(Expression(Integer),...)
--E 63

--S 64 of 165
--m0012:= a0012-r0012
--E 64

--S 65 of 165
--d0012:= D(m0012,x)
--E 65

--S 66 of 165
t0013:= cos(b*x)*Ci(b*x)/x^3
--R
--R
--R         Ci(b x)cos(b x)
--R   (33)  ---------------
--R                 3
--R                x
--R                                                  Type: Expression(Integer)
--E 66

--S 67 of 165
r0013:= 1/4*(-cos(b*x)^2-2*cos(b*x)*Ci(b*x)-x^2*Ci(b*x)^2*b^2-_
        4*b^2*Ci(2*b*x)*x^2+2*x*cos(b*x)*sin(b*x)*b+_
        2*x*Ci(b*x)*sin(b*x)*b+x*b*sin(2*b*x))/x^2
--R
--R
--R   (34)
```

```
--R                                                                          2
--R       b x sin(2b x) + (2b x cos(b x) + 2b x Ci(b x))sin(b x) - cos(b x)
--R     +
--R                               2 2            2 2       2
--R       - 2Ci(b x)cos(b x) - 4b x Ci(2b x) - b x Ci(b x)
--R  /
--R       2
--R     4x
--R                                                    Type: Expression(Integer)
--E 67

--S 68 of 165
a0013:= integrate(t0013,x)
--R
--R
--R            x
--R          ++  Ci(%A b)cos(%A b)
--R   (35)   |   ----------------- d%A
--R         ++            3
--R                      %A
--R                                          Type: Union(Expression(Integer),...)
--E 68

--S 69 of 165
--m0013:= a0013-r0013
--E 69

--S 70 of 165
--d0013:= D(m0013,x)
--E 70

--S 71 of 165
t0014:= x*cos(a+b*x)*Ci(c+d*x)
--R
--R
--R   (36)  x Ci(d x + c)cos(b x + a)
--R                                                    Type: Expression(Integer)
--E 71

--S 72 of 165
r0014:= 1/2*cos(a-c+(b-d)*x)/b/(b-d)+1/2*cos(a+c+(b+d)*x)/b/(b+d)+_
        cos(a+b*x)*Ci(c+d*x)/b^2-1/2*cos(a-b*c/d)*Ci((b-d)*(c+d*x)/d)/b^2-_
        1/2*cos(a-b*c/d)*Ci((b+d)*(c+d*x)/d)/b^2+_
        1/2*c*Ci((b-d)*(c+d*x)/d)*sin(a-b*c/d)/b/d+_
        1/2*c*Ci((b+d)*(c+d*x)/d)*sin(a-b*c/d)/b/d+_
        x*Ci(c+d*x)*sin(a+b*x)/b+1/2*c*cos(a-b*c/d)*Si((b-d)*(c+d*x)/d)/b/d+_
        1/2*sin(a-b*c/d)*Si((b-d)*(c+d*x)/d)/b^2+_
        1/2*c*cos(a-b*c/d)*Si((b+d)*(c+d*x)/d)/b/d+_
        1/2*sin(a-b*c/d)*Si((b+d)*(c+d*x)/d)/b^2
--R
```

```
--R
--R   (37)
--R            3     3
--R       (2b d  - 2b d)x Ci(d x + c)sin(b x + a)
--R     +
--R                          2
--R             3    2     (d  + b d)x + c d + b c
--R           (d  - b d)Si(-----------------------)
--R                                d
--R         +
--R                           2
--R              3    2     (d  - b d)x + c d - b c
--R           (- d  + b d)Si(-----------------------)
--R                                d
--R         +
--R                             2
--R                2    3     (d  + b d)x + c d + b c
--R           (b c d  - b c)Ci(-----------------------)
--R                                   d
--R         +
--R                               2
--R                2    3     (- d  + b d)x - c d + b c
--R           (b c d  - b c)Ci(--------------------------)
--R                                   d
--R      *
--R             a d - b c
--R         sin(---------)
--R                 d
--R     +
--R           2    2                                    2    2
--R       (b d  - b d)cos((d + b)x + c + a) + (- b d  - b d)cos((d - b)x + c - a)
--R     +
--R          3     2
--R       (2d  - 2b d)Ci(d x + c)cos(b x + a)
--R     +
--R                             2
--R                2    3     (d  + b d)x + c d + b c
--R           (b c d  - b c)Si(-----------------------)
--R                                   d
--R         +
--R                               2
--R                  2    3     (d  - b d)x + c d - b c
--R           (- b c d  + b c)Si(-----------------------)
--R                                    d
--R         +
--R                           2
--R              3    2     (d  + b d)x + c d + b c
--R           (- d  + b d)Ci(-----------------------)
--R                                d
--R         +
```

```
--R                                2
--R               3    2     (- d  + b d)x - c d + b c
--R           (- d  + b d)Ci(-------------------------)
--R                                      d
--R      *
--R             a d - b c
--R         cos(---------)
--R                 d
--R  /
--R       2 3     4
--R     2b d  - 2b d
--R                                                    Type: Expression(Integer)
--E 72

--S 73 of 165
a0014:= integrate(t0014,x)
--R
--R
--R            x
--R          ++
--R   (38)   |   %A Ci(%A d + c)cos(%A b + a)d%A
--R         ++
--R                                          Type: Union(Expression(Integer),...)
--E 73

--S 74 of 165
--m0014:= a0014-r0014
--E 74

--S 75 of 165
--d0014:= D(m0014,x)
--E 75

--S 76 of 165
t0015:= x^m*Shi(b*x)
--R
--R   There are no library operations named Shi
--R      Use HyperDoc Browse or issue
--R                                )what op Shi
--R      to learn if there is any operation containing " Shi " in its
--R      name.
--R
--R   Cannot find a definition or applicable library operation named Shi
--R      with argument type(s)
--R                              Polynomial(Integer)
--R
--R      Perhaps you should use "@" to indicate the required return type,
--R      or "$" to specify which version of the function you need.
--E 76
```

```
--S 77 of 165
r0015:= -1/2/b/(1+m)*(x^m*(b*x)^(-m)*Gamma(1+m,b*x)+x^m*(-b*x)^(-m)*_
        Gamma(1+m,-b*x)-2*x^(1+m)*Shi(b*x)*b)
--R
--R   There are no library operations named Shi
--R      Use HyperDoc Browse or issue
--R                                )what op Shi
--R      to learn if there is any operation containing " Shi " in its
--R      name.
--R
--R   Cannot find a definition or applicable library operation named Shi
--R      with argument type(s)
--R                             Polynomial(Integer)
--R
--R      Perhaps you should use "@" to indicate the required return type,
--R      or "$" to specify which version of the function you need.
--E 77

--S 78 of 165
--a0015:= integrate(t0015,x)
--E 78

--S 79 of 165
--m0015:= a0015-r0015
--E 79

--S 80 of 165
--d0015:= D(m0015,x)
--E 80

--S 81 of 165
t0016:= Shi(a+b*x)/x^3
--R
--R   There are no library operations named Shi
--R      Use HyperDoc Browse or issue
--R                                )what op Shi
--R      to learn if there is any operation containing " Shi " in its
--R      name.
--R
--R   Cannot find a definition or applicable library operation named Shi
--R      with argument type(s)
--R                             Polynomial(Integer)
--R
--R      Perhaps you should use "@" to indicate the required return type,
--R      or "$" to specify which version of the function you need.
--E 81

--S 82 of 165
r0016:= 1/2*(b^2*cosh(a)*Chi(b*x)*a*x^2-b^2*Chi(b*x)*sinh(a)*x^2-_
        b*sinh(a+b*x)*a*x-b^2*cosh(a)*Shi(b*x)*x^2+b^2*sinh(a)*_
```

```
        Shi(b*x)*a*x^2+b^2*Shi(a+b*x)*x^2-Shi(a+b*x)*a^2)/a^2/x^2
--R
--R   There are no library operations named Chi
--R      Use HyperDoc Browse or issue
--R                                )what op Chi
--R      to learn if there is any operation containing " Chi " in its
--R      name.
--R
--R   Cannot find a definition or applicable library operation named Chi
--R      with argument type(s)
--R                             Polynomial(Integer)
--R
--R      Perhaps you should use "@" to indicate the required return type,
--R      or "$" to specify which version of the function you need.
--E 82

--S 83 of 165
--a0016:= integrate(t0016,x)
--E 83

--S 84 of 165
--m0016:= a0016-r0016
--E 84

--S 85 of 165
--d0016:= D(m0016,x)
--E 85

--S 86 of 165
t0017:= Shi(a+b*x)/x^2
--R
--R   There are no library operations named Shi
--R      Use HyperDoc Browse or issue
--R                                )what op Shi
--R      to learn if there is any operation containing " Shi " in its
--R      name.
--R
--R   Cannot find a definition or applicable library operation named Shi
--R      with argument type(s)
--R                             Polynomial(Integer)
--R
--R      Perhaps you should use "@" to indicate the required return type,
--R      or "$" to specify which version of the function you need.
--E 86

--S 87 of 165
r0017:= (b*Chi(b*x)*sinh(a)*x+b*cosh(a)*Shi(b*x)*x-Shi(a+b*x)*b*x-_
        Shi(a+b*x)*a)/a/x
--R
--R   There are no library operations named Chi
```

```
--R      Use HyperDoc Browse or issue
--R                                )what op Chi
--R      to learn if there is any operation containing " Chi " in its
--R      name.
--R
--R   Cannot find a definition or applicable library operation named Chi
--R      with argument type(s)
--R                             Polynomial(Integer)
--R
--R      Perhaps you should use "@" to indicate the required return type,
--R      or "$" to specify which version of the function you need.
--E 87

--S 88 of 165
--a0017:= integrate(t0017,x)
--E 88

--S 89 of 165
--m0017:= a0017-r0017
--E 89

--S 90 of 165
--d0017:= D(m0017,x)
--E 90

--S 91 of 165
t0018:= sinh(b*x)*Shi(b*x)/x^3
--R
--R   There are no library operations named Shi
--R      Use HyperDoc Browse or issue
--R                                )what op Shi
--R      to learn if there is any operation containing " Shi " in its
--R      name.
--R
--R   Cannot find a definition or applicable library operation named Shi
--R      with argument type(s)
--R                             Polynomial(Integer)
--R
--R      Perhaps you should use "@" to indicate the required return type,
--R      or "$" to specify which version of the function you need.
--E 91

--S 92 of 165
r0018:= -1/4*(-4*b^2*Chi(2*b*x)*x^2+2*x*cosh(b*x)*sinh(b*x)*b+cosh(b*x)^2-_
        1+x*b*sinh(2*b*x)+2*x*cosh(b*x)*Shi(b*x)*b+2*sinh(b*x)*Shi(b*x)-_
        x^2*Shi(b*x)^2*b^2)/x^2
--R
--R   There are no library operations named Chi
--R      Use HyperDoc Browse or issue
--R                                )what op Chi
```

```
--R      to learn if there is any operation containing " Chi " in its
--R      name.
--R
--R   Cannot find a definition or applicable library operation named Chi
--R      with argument type(s)
--R                              Polynomial(Integer)
--R
--R      Perhaps you should use "@" to indicate the required return type,
--R      or "$" to specify which version of the function you need.
--E 92

--S 93 of 165
--a0018:= integrate(t0018,x)
--E 93

--S 94 of 165
--m0018:= a0018-r0018
--E 94

--S 95 of 165
--d0018:= D(m0018,x)
--E 95

--S 96 of 165
t0019:= sinh(a+b*x)*Shi(c+d*x)
--R
--R   There are no library operations named Shi
--R      Use HyperDoc Browse or issue
--R                                  )what op Shi
--R      to learn if there is any operation containing " Shi " in its
--R      name.
--R
--R   Cannot find a definition or applicable library operation named Shi
--R      with argument type(s)
--R                              Polynomial(Integer)
--R
--R      Perhaps you should use "@" to indicate the required return type,
--R      or "$" to specify which version of the function you need.
--E 96

--S 97 of 165
r0019:= 1/2*(Chi((b-d)*(c+d*x)/d)*sinh((-b*c+a*d)/d)-_
        Chi((b+d)*(c+d*x)/d)*sinh((-b*c+a*d)/d)+2*cosh(a+b*x)*Shi(c+d*x)+_
        cosh((-b*c+a*d)/d)*Shi((b-d)*(c+d*x)/d)-_
        cosh((-b*c+a*d)/d)*Shi((b+d)*(c+d*x)/d))/b
--R
--R   There are no library operations named Chi
--R      Use HyperDoc Browse or issue
--R                                  )what op Chi
--R      to learn if there is any operation containing " Chi " in its
```

```
--R      name.
--R
--R   Cannot find a definition or applicable library operation named Chi
--R      with argument type(s)
--R                          Fraction(Polynomial(Integer))
--R
--R      Perhaps you should use "@" to indicate the required return type,
--R      or "$" to specify which version of the function you need.
--E 97

--S 98 of 165
--a0019:= integrate(t0019,x)
--E 98

--S 99 of 165
--m0019:= a0019-r0019
--E 99

--S 100 of 165
--d0019:= D(m0019,x)
--E 100

--S 101 of 165
t0020:= x*sinh(a+b*x)*Shi(c+d*x)
--R
--R   There are no library operations named Shi
--R      Use HyperDoc Browse or issue
--R                                  )what op Shi
--R      to learn if there is any operation containing " Shi " in its
--R      name.
--R
--R   Cannot find a definition or applicable library operation named Shi
--R      with argument type(s)
--R                              Polynomial(Integer)
--R
--R      Perhaps you should use "@" to indicate the required return type,
--R      or "$" to specify which version of the function you need.
--E 101

--S 102 of 165
r0020:= 1/2*cosh(a-c+(b-d)*x)/b/(b-d)-1/2*cosh(a+c+(b+d)*x)/b/(b+d)-_
        1/2*cosh(a-b*c/d)*Chi((b-d)*(c+d*x)/d)/b^2+_
        1/2*cosh(a-b*c/d)*Chi((b+d)*(c+d*x)/d)/b^2-_
        1/2*c*Chi((b-d)*(c+d*x)/d)*sinh(a-b*c/d)/b/d+_
        1/2*c*Chi((b+d)*(c+d*x)/d)*sinh(a-b*c/d)/b/d+x*cosh(a+b*x)*_
        Shi(c+d*x)/b-sinh(a+b*x)*Shi(c+d*x)/b^2-1/2*c*cosh(a-b*c/d)*_
        Shi((b-d)*(c+d*x)/d)/b/d-1/2*sinh(a-b*c/d)*Shi((b-d)*(c+d*x)/d)/b^2+_
        1/2*c*cosh(a-b*c/d)*Shi((b+d)*(c+d*x)/d)/b/d+_
        1/2*sinh(a-b*c/d)*Shi((b+d)*(c+d*x)/d)/b^2
--R
```

```
--R   There are no library operations named Chi
--R      Use HyperDoc Browse or issue
--R                                )what op Chi
--R      to learn if there is any operation containing " Chi " in its
--R      name.
--R
--R   Cannot find a definition or applicable library operation named Chi
--R      with argument type(s)
--R                         Fraction(Polynomial(Integer))
--R
--R      Perhaps you should use "@" to indicate the required return type,
--R      or "$" to specify which version of the function you need.
--E 102

--S 103 of 165
--a0020:= integrate(t0020,x)
--E 103

--S 104 of 165
--m0020:= a0020-r0020
--E 104

--S 105 of 165
--d0020:= D(m0020,x)
--E 105

--S 106 of 165
t0021:= cosh(b*x)*Shi(b*x)/x^2
--R
--R   There are no library operations named Shi
--R      Use HyperDoc Browse or issue
--R                                )what op Shi
--R      to learn if there is any operation containing " Shi " in its
--R      name.
--R
--R   Cannot find a definition or applicable library operation named Shi
--R      with argument type(s)
--R                              Polynomial(Integer)
--R
--R      Perhaps you should use "@" to indicate the required return type,
--R      or "$" to specify which version of the function you need.
--E 106

--S 107 of 165
r0021:= 1/2*(2*b*Chi(2*b*x)*x-sinh(2*b*x)-_
        2*cosh(b*x)*Shi(b*x)+x*Shi(b*x)^2*b)/x
--R
--R   There are no library operations named Chi
--R      Use HyperDoc Browse or issue
--R                                )what op Chi
```

```
--R      to learn if there is any operation containing " Chi " in its
--R      name.
--R
--R   Cannot find a definition or applicable library operation named Chi
--R      with argument type(s)
--R                              Polynomial(Integer)
--R
--R      Perhaps you should use "@" to indicate the required return type,
--R      or "$" to specify which version of the function you need.
--E 107

--S 108 of 165
--a0021:= integrate(t0021,x)
--E 108

--S 109 of 165
--m0021:= a0021-r0021
--E 109

--S 110 of 165
--d0021:= D(m0021,x)
--E 110

--S 111 of 165
t0022:= cosh(a+b*x)*Shi(c+d*x)
--R
--R   There are no library operations named Shi
--R      Use HyperDoc Browse or issue
--R                                  )what op Shi
--R      to learn if there is any operation containing " Shi " in its
--R      name.
--R
--R   Cannot find a definition or applicable library operation named Shi
--R      with argument type(s)
--R                              Polynomial(Integer)
--R
--R      Perhaps you should use "@" to indicate the required return type,
--R      or "$" to specify which version of the function you need.
--E 111

--S 112 of 165
r0022:= -1/2*(-cosh((-b*c+a*d)/d)*Chi((b-d)*(c+d*x)/d)+_
        cosh((-b*c+a*d)/d)*Chi((b+d)*(c+d*x)/d)-_
        2*sinh(a+b*x)*Shi(c+d*x)-sinh((-b*c+a*d)/d)*Shi((b-d)*(c+d*x)/d)+_
        sinh((-b*c+a*d)/d)*Shi((b+d)*(c+d*x)/d))/b
--R
--R   There are no library operations named Chi
--R      Use HyperDoc Browse or issue
--R                                  )what op Chi
--R      to learn if there is any operation containing " Chi " in its
```

```
--R      name.
--R
--R   Cannot find a definition or applicable library operation named Chi
--R      with argument type(s)
--R                          Fraction(Polynomial(Integer))
--R
--R      Perhaps you should use "@" to indicate the required return type,
--R      or "$" to specify which version of the function you need.
--E 112

--S 113 of 165
--a0022:= integrate(t0022,x)
--E 113

--S 114 of 165
--m0022:= a0022-r0022
--E 114

--S 115 of 165
--d0022:= D(m0022,x)
--E 115

--S 116 of 165
t0023:= x*cosh(a+b*x)*Shi(c+d*x)
--R
--R   There are no library operations named Shi
--R      Use HyperDoc Browse or issue
--R                                  )what op Shi
--R      to learn if there is any operation containing " Shi " in its
--R      name.
--R
--R   Cannot find a definition or applicable library operation named Shi
--R      with argument type(s)
--R                              Polynomial(Integer)
--R
--R      Perhaps you should use "@" to indicate the required return type,
--R      or "$" to specify which version of the function you need.
--E 116

--S 117 of 165
r0023:= -1/2*c*cosh(a-b*c/d)*Chi((b-d)*(c+d*x)/d)/b/d+_
        1/2*c*cosh(a-b*c/d)*Chi((b+d)*(c+d*x)/d)/b/d-_
        1/2*Chi((b-d)*(c+d*x)/d)*sinh(a-b*c/d)/b^2+_
        1/2*Chi((b+d)*(c+d*x)/d)*sinh(a-b*c/d)/b^2+_
        1/2*sinh(a-c+(b-d)*x)/b/(b-d)-_
        1/2*sinh(a+c+(b+d)*x)/b/(b+d)-cosh(a+b*x)*Shi(c+d*x)/b^2+_
        x*sinh(a+b*x)*Shi(c+d*x)/b-1/2*cosh(a-b*c/d)*_
        Shi((b-d)*(c+d*x)/d)/b^2-1/2*c*sinh(a-b*c/d)*_
        Shi((b-d)*(c+d*x)/d)/b/d+1/2*cosh(a-b*c/d)*_
        Shi((b+d)*(c+d*x)/d)/b^2+1/2*c*sinh(a-b*c/d)*Shi((b+d)*(c+d*x)/d)/b/d
```

```
--R
--R   There are no library operations named Chi
--R      Use HyperDoc Browse or issue
--R                                )what op Chi
--R      to learn if there is any operation containing " Chi " in its
--R      name.
--R
--R   Cannot find a definition or applicable library operation named Chi
--R      with argument type(s)
--R                         Fraction(Polynomial(Integer))
--R
--R      Perhaps you should use "@" to indicate the required return type,
--R      or "$" to specify which version of the function you need.
--E 117

--S 118 of 165
--a0023:= integrate(t0023,x)
--E 118

--S 119 of 165
--m0023:= a0023-r0023
--E 119

--S 120 of 165
--d0023:= D(m0023,x)
--E 120

--S 121 of 165
t0024:= x^m*Chi(b*x)
--R
--R   There are no library operations named Chi
--R      Use HyperDoc Browse or issue
--R                                )what op Chi
--R      to learn if there is any operation containing " Chi " in its
--R      name.
--R
--R   Cannot find a definition or applicable library operation named Chi
--R      with argument type(s)
--R                              Polynomial(Integer)
--R
--R      Perhaps you should use "@" to indicate the required return type,
--R      or "$" to specify which version of the function you need.
--E 121

--S 122 of 165
r0024:= 1/2/b/(1+m)*(x^m*(b*x)^(-m)*Gamma(1+m,b*x)-x^m*(-b*x)^(-m)*_
        Gamma(1+m,-b*x)+2*x^(1+m)*Chi(b*x)*b)
--R
--R   There are no library operations named Chi
--R      Use HyperDoc Browse or issue
```

```
--R                                )what op Chi
--R      to learn if there is any operation containing " Chi " in its
--R      name.
--R
--R   Cannot find a definition or applicable library operation named Chi
--R      with argument type(s)
--R                             Polynomial(Integer)
--R
--R      Perhaps you should use "@" to indicate the required return type,
--R      or "$" to specify which version of the function you need.
--E 122

--S 123 of 165
--a0024:= integrate(t0024,x)
--E 123

--S 124 of 165
--m0024:= a0024-r0024
--E 124

--S 125 of 165
--d0024:= D(m0024,x)
--E 125

--S 126 of 165
t0025:= Chi(a+b*x)/x^3
--R
--R   There are no library operations named Chi
--R      Use HyperDoc Browse or issue
--R                                )what op Chi
--R      to learn if there is any operation containing " Chi " in its
--R      name.
--R
--R   Cannot find a definition or applicable library operation named Chi
--R      with argument type(s)
--R                             Polynomial(Integer)
--R
--R      Perhaps you should use "@" to indicate the required return type,
--R      or "$" to specify which version of the function you need.
--E 126

--S 127 of 165
r0025:= -1/2*(b*cosh(a+b*x)*a*x+b^2*cosh(a)*Chi(b*x)*x^2-_
        b^2*Chi(a+b*x)*x^2+Chi(a+b*x)*a^2-b^2*Chi(b*x)*sinh(a)*a*x^2-_
        b^2*cosh(a)*Shi(b*x)*a*x^2+b^2*sinh(a)*Shi(b*x)*x^2)/a^2/x^2
--R
--R   There are no library operations named Chi
--R      Use HyperDoc Browse or issue
--R                                )what op Chi
--R      to learn if there is any operation containing " Chi " in its
```

```
--R      name.
--R
--R   Cannot find a definition or applicable library operation named Chi
--R      with argument type(s)
--R                              Polynomial(Integer)
--R
--R      Perhaps you should use "@" to indicate the required return type,
--R      or "$" to specify which version of the function you need.
--E 127

--S 128 of 165
--a0025:= integrate(t0025,x)
--E 128

--S 129 of 165
--m0025:= a0025-r0025
--E 129

--S 130 of 165
--d0025:= D(m0025,x)
--E 130

--S 131 of 165
t0026:= Chi(a+b*x)/x^2
--R
--R   There are no library operations named Chi
--R      Use HyperDoc Browse or issue
--R                                  )what op Chi
--R      to learn if there is any operation containing " Chi " in its
--R      name.
--R
--R   Cannot find a definition or applicable library operation named Chi
--R      with argument type(s)
--R                              Polynomial(Integer)
--R
--R      Perhaps you should use "@" to indicate the required return type,
--R      or "$" to specify which version of the function you need.
--E 131

--S 132 of 165
r0026:= (b*cosh(a)*Chi(b*x)*x-Chi(a+b*x)*b*x-Chi(a+b*x)*a+_
        b*sinh(a)*Shi(b*x)*x)/a/x
--R
--R   There are no library operations named Chi
--R      Use HyperDoc Browse or issue
--R                                  )what op Chi
--R      to learn if there is any operation containing " Chi " in its
--R      name.
--R
--R   Cannot find a definition or applicable library operation named Chi
```

```
--R      with argument type(s)
--R                              Polynomial(Integer)
--R
--R      Perhaps you should use "@" to indicate the required return type,
--R      or "$" to specify which version of the function you need.
--E 132

--S 133 of 165
--a0026:= integrate(t0026,x)
--E 133

--S 134 of 165
--m0026:= a0026-r0026
--E 134

--S 135 of 165
--d0026:= D(m0026,x)
--E 135

--S 136 of 165
t0027:= Chi(b*x)*sinh(b*x)/x^2
--R
--R   There are no library operations named Chi
--R      Use HyperDoc Browse or issue
--R                                   )what op Chi
--R      to learn if there is any operation containing " Chi " in its
--R      name.
--R
--R   Cannot find a definition or applicable library operation named Chi
--R      with argument type(s)
--R                              Polynomial(Integer)
--R
--R      Perhaps you should use "@" to indicate the required return type,
--R      or "$" to specify which version of the function you need.
--E 136

--S 137 of 165
r0027:= 1/2*(x*Chi(b*x)^2*b+2*b*Chi(2*b*x)*x-2*sinh(b*x)*Chi(b*x)-_
       sinh(2*b*x))/x
--R
--R   There are no library operations named Chi
--R      Use HyperDoc Browse or issue
--R                                   )what op Chi
--R      to learn if there is any operation containing " Chi " in its
--R      name.
--R
--R   Cannot find a definition or applicable library operation named Chi
--R      with argument type(s)
--R                              Polynomial(Integer)
--R
```

```
--R      Perhaps you should use "@" to indicate the required return type,
--R      or "$" to specify which version of the function you need.
--E 137

--S 138 of 165
--a0027:= integrate(t0027,x)
--E 138

--S 139 of 165
--m0027:= a0027-r0027
--E 139

--S 140 of 165
--d0027:= D(m0027,x)
--E 140

--S 141 of 165
t0028:= sinh(a+b*x)*Chi(c+d*x)
--R
--R   There are no library operations named Chi
--R      Use HyperDoc Browse or issue
--R                                )what op Chi
--R      to learn if there is any operation containing " Chi " in its
--R      name.
--R
--R   Cannot find a definition or applicable library operation named Chi
--R      with argument type(s)
--R                             Polynomial(Integer)
--R
--R      Perhaps you should use "@" to indicate the required return type,
--R      or "$" to specify which version of the function you need.
--E 141

--S 142 of 165
r0028:= -1/2*(-2*cosh(a+b*x)*Chi(c+d*x)+cosh((-b*c+a*d)/d)*_
        Chi((b-d)*(c+d*x)/d)+cosh((-b*c+a*d)/d)*Chi((b+d)*(c+d*x)/d)+_
        sinh((-b*c+a*d)/d)*Shi((b-d)*(c+d*x)/d)+sinh((-b*c+a*d)/d)*_
        Shi((b+d)*(c+d*x)/d))/b
--R
--R   There are no library operations named Chi
--R      Use HyperDoc Browse or issue
--R                                )what op Chi
--R      to learn if there is any operation containing " Chi " in its
--R      name.
--R
--R   Cannot find a definition or applicable library operation named Chi
--R      with argument type(s)
--R                             Polynomial(Integer)
--R
--R      Perhaps you should use "@" to indicate the required return type,
```

```
--R      or "$" to specify which version of the function you need.
--E 142

--S 143 of 165
--a0028:= integrate(t0028,x)
--E 143

--S 144 of 165
--m0028:= a0028-r0028
--E 144

--S 145 of 165
--d0028:= D(m0028,x)
--E 145

--S 146 of 165
t0029:= x*sinh(a+b*x)*Chi(c+d*x)
--R
--R   There are no library operations named Chi
--R      Use HyperDoc Browse or issue
--R                                )what op Chi
--R      to learn if there is any operation containing " Chi " in its
--R      name.
--R
--R   Cannot find a definition or applicable library operation named Chi
--R      with argument type(s)
--R                             Polynomial(Integer)
--R
--R      Perhaps you should use "@" to indicate the required return type,
--R      or "$" to specify which version of the function you need.
--E 146

--S 147 of 165
r0029:= x*cosh(a+b*x)*Chi(c+d*x)/b+1/2*c*cosh(a-b*c/d)*_
        Chi((b-d)*(c+d*x)/d)/b/d+1/2*c*cosh(a-b*c/d)*_
        Chi((b+d)*(c+d*x)/d)/b/d+1/2*Chi((b-d)*(c+d*x)/d)*_
        sinh(a-b*c/d)/b^2+1/2*Chi((b+d)*(c+d*x)/d)*sinh(a-b*c/d)/b^2-_
        Chi(c+d*x)*sinh(a+b*x)/b^2-1/2*sinh(a-c+(b-d)*x)/b/(b-d)-_
        1/2*sinh(a+c+(b+d)*x)/b/(b+d)+1/2*cosh(a-b*c/d)*_
        Shi((b-d)*(c+d*x)/d)/b^2+1/2*c*sinh(a-b*c/d)*_
        Shi((b-d)*(c+d*x)/d)/b/d+1/2*cosh(a-b*c/d)*_
        Shi((b+d)*(c+d*x)/d)/b^2+1/2*c*sinh(a-b*c/d)*Shi((b+d)*(c+d*x)/d)/b/d
--R
--R   There are no library operations named Chi
--R      Use HyperDoc Browse or issue
--R                                )what op Chi
--R      to learn if there is any operation containing " Chi " in its
--R      name.
--R
--R   Cannot find a definition or applicable library operation named Chi
```

```
--R      with argument type(s)
--R                              Polynomial(Integer)
--R
--R      Perhaps you should use "@" to indicate the required return type,
--R      or "$" to specify which version of the function you need.
--E 147

--S 148 of 165
--a0029:= integrate(t0029,x)
--E 148

--S 149 of 165
--m0029:= a0029-r0029
--E 149

--S 150 of 165
--d0029:= D(m0029,x)
--E 150

--S 151 of 165
t0030:= cosh(b*x)*Chi(b*x)/x^3
--R
--R   There are no library operations named Chi
--R      Use HyperDoc Browse or issue
--R                                   )what op Chi
--R      to learn if there is any operation containing " Chi " in its
--R      name.
--R
--R   Cannot find a definition or applicable library operation named Chi
--R      with argument type(s)
--R                              Polynomial(Integer)
--R
--R      Perhaps you should use "@" to indicate the required return type,
--R      or "$" to specify which version of the function you need.
--E 151

--S 152 of 165
r0030:= 1/4*(-cosh(b*x)^2-2*cosh(b*x)*Chi(b*x)+x^2*Chi(b*x)^2*b^2+_
        4*b^2*Chi(2*b*x)*x^2-2*x*cosh(b*x)*sinh(b*x)*b-_
        2*x*Chi(b*x)*sinh(b*x)*b-x*b*sinh(2*b*x))/x^2
--R
--R   There are no library operations named Chi
--R      Use HyperDoc Browse or issue
--R                                   )what op Chi
--R      to learn if there is any operation containing " Chi " in its
--R      name.
--R
--R   Cannot find a definition or applicable library operation named Chi
--R      with argument type(s)
--R                              Polynomial(Integer)
```

```
--R
--R      Perhaps you should use "@" to indicate the required return type,
--R      or "$" to specify which version of the function you need.
--E 152

--S 153 of 165
--a0030:= integrate(t0030,x)
--E 153

--S 154 of 165
--m0030:= a0030-r0030
--E 154

--S 155 of 165
--d0030:= D(m0030,x)
--E 155

--S 156 of 165
t0031:= cosh(a+b*x)*Chi(c+d*x)
--R
--R   There are no library operations named Chi
--R      Use HyperDoc Browse or issue
--R                                )what op Chi
--R      to learn if there is any operation containing " Chi " in its
--R      name.
--R
--R   Cannot find a definition or applicable library operation named Chi
--R      with argument type(s)
--R                             Polynomial(Integer)
--R
--R      Perhaps you should use "@" to indicate the required return type,
--R      or "$" to specify which version of the function you need.
--E 156

--S 157 of 165
r0031:= -1/2*(Chi((b-d)*(c+d*x)/d)*sinh((-b*c+a*d)/d)+_
        Chi((b+d)*(c+d*x)/d)*sinh((-b*c+a*d)/d)-2*sinh(a+b*x)*_
        Chi(c+d*x)+cosh((-b*c+a*d)/d)*Shi((b-d)*(c+d*x)/d)+_
        cosh((-b*c+a*d)/d)*Shi((b+d)*(c+d*x)/d))/b
--R
--R   There are no library operations named Chi
--R      Use HyperDoc Browse or issue
--R                                )what op Chi
--R      to learn if there is any operation containing " Chi " in its
--R      name.
--R
--R   Cannot find a definition or applicable library operation named Chi
--R      with argument type(s)
--R                          Fraction(Polynomial(Integer))
--R
```

```
--R      Perhaps you should use "@" to indicate the required return type,
--R      or "$" to specify which version of the function you need.
--E 157

--S 158 of 165
--a0031:= integrate(t0031,x)
--E 158

--S 159 of 165
--m0031:= a0031-r0031
--E 159

--S 160 of 165
--d0031:= D(m0031,x)
--E 160

--S 161 of 165
t0032:= x*cosh(a+b*x)*Chi(c+d*x)
--R
--R   There are no library operations named Chi
--R      Use HyperDoc Browse or issue
--R                                )what op Chi
--R      to learn if there is any operation containing " Chi " in its
--R      name.
--R
--R   Cannot find a definition or applicable library operation named Chi
--R      with argument type(s)
--R                             Polynomial(Integer)
--R
--R      Perhaps you should use "@" to indicate the required return type,
--R      or "$" to specify which version of the function you need.
--E 161

--S 162 of 165
r0032:= -1/2*cosh(a-c+(b-d)*x)/b/(b-d)-1/2*cosh(a+c+(b+d)*x)/b/(b+d)-_
        cosh(a+b*x)*Chi(c+d*x)/b^2+1/2*cosh(a-b*c/d)*_
        Chi((b-d)*(c+d*x)/d)/b^2+1/2*cosh(a-b*c/d)*Chi((b+d)*(c+d*x)/d)/b^2+_
        1/2*c*Chi((b-d)*(c+d*x)/d)*sinh(a-b*c/d)/b/d+_
        1/2*c*Chi((b+d)*(c+d*x)/d)*sinh(a-b*c/d)/b/d+x*_
        Chi(c+d*x)*sinh(a+b*x)/b+1/2*c*cosh(a-b*c/d)*_
        Shi((b-d)*(c+d*x)/d)/b/d+1/2*sinh(a-b*c/d)*_
        Shi((b-d)*(c+d*x)/d)/b^2+1/2*c*cosh(a-b*c/d)*_
        Shi((b+d)*(c+d*x)/d)/b/d+1/2*sinh(a-b*c/d)*Shi((b+d)*(c+d*x)/d)/b^2
--R
--R   There are no library operations named Chi
--R      Use HyperDoc Browse or issue
--R                                )what op Chi
--R      to learn if there is any operation containing " Chi " in its
--R      name.
--R
```

```
--R   Cannot find a definition or applicable library operation named Chi
--R      with argument type(s)
--R                              Polynomial(Integer)
--R
--R      Perhaps you should use "@" to indicate the required return type,
--R      or "$" to specify which version of the function you need.
--E 162

--S 163 of 165
--a0032:= integrate(t0032,x)
--E 163

--S 164 of 165
--m0032:= a0032-r0032
--E 164

--S 165 of 165
--d0032:= D(m0032,x)
--E 165

)spool
```

References

[1] Rich, Albert D. "Rule-based Mathematics" www.apmaths.uwo.ca/~arich