

\$SPAD/src/input richspecfunc000-022.input

Albert Rich and Timothy Daly

July 14, 2013

Abstract

Contents

```

      ___ * ___

)set break resume
)sys rm -f richspecfunc000-022.output
)spool richspecfunc000-022.output
)set message auto off
)clear all

--S 1 of 115
t0000:= Gamma(n,a+b*x)
--R
--R
--R
--R (1) | (n,b x + a)
--R
--R                                          Type: Expression(Integer)
--E 1

--S 2 of 115
r0000:= (a+b*x)*Gamma(n,a+b*x)/b-Gamma(1+n,a+b*x)/b
--R
--R
--R
--R          -
--R          | (n + 1,b x + a) + (b x + a)| (n,b x + a)
--R (2) -----
--R                                  b
--R
--R                                          Type: Expression(Integer)
--E 2

--S 3 of 115
a0000:= integrate(t0000,x)
--R
--R
--R
--R          x
--R          ++
--R          | | (n,%K b + a)d%K
--R          ++
--R
--R                                          Type: Union(Expression(Integer),...)
--E 3

--S 4 of 115
--m0000:= a0000-r0000
--E 4

--S 5 of 115
--d0000:= D(m0000,x)
--E 5

--S 6 of 115
t0001:= x*Gamma(n,a+b*x)

```

```

--R
--R
--R
--R (4)  $x | (n, b x + a)$ 
--R
--R Type: Expression(Integer)
--E 6

```

```

--S 7 of 115
r0001:= -1/2*(a^2/b^2-x^2)*Gamma(n,a+b*x)+a*Gamma(1+n,a+b*x)/b^2-1/2*_
Gamma(2+n,a+b*x)/b^2
--R
--R
--R
--R (5) 
$$\frac{- | (n + 2, b x + a) + 2a | (n + 1, b x + a) + (b x^2 - a^2) | (n, b x + a)}{2b^2}$$

--R
--R Type: Expression(Integer)
--E 7

```

```

--S 8 of 115
a0001:= integrate(t0001,x)
--R
--R
--R
--R (6) 
$$\int x | (n, \%K b + a) d \%K$$

--R
--R Type: Union(Expression(Integer),...)
--E 8

```

```

--S 9 of 115
--m0001:= a0001-r0001
--E 9

```

```

--S 10 of 115
--d0001:= D(m0001,x)
--E 10

```

```

--S 11 of 115
t0002:= x^2*Gamma(n,a+b*x)
--R
--R
--R
--R (7)  $x^2 | (n, b x + a)$ 
--R
--R Type: Expression(Integer)
--E 11

```

```

--S 12 of 115
r0002:= -1/3*(-Gamma(n,a+b*x)*a^3-Gamma(n,a+b*x)*b^3*x^3+3*a^2*_

```

```

Gamma(1+n,a+b*x)-3*a*Gamma(2+n,a+b*x)+Gamma(3+n,a+b*x))/b^3
--R
--R
--R (8)
--R      - | (n + 3,b x + a) + 3a| (n + 2,b x + a) - 3a | (n + 1,b x + a)
--R      +
--R      3 3 3
--R      (b x + a )| (n,b x + a)
--R /
--R 3
--R 3b
--R
--R                                          Type: Expression(Integer)
--E 12

```

```

--S 13 of 115
a0002:= integrate(t0002,x)
--R
--R
--R      x
--R      ++ 2
--R (9) | %K | (n,%K b + a)d%K
--R      ++
--R
--R                                          Type: Union(Expression(Integer),...)
--E 13

```

```

--S 14 of 115
--m0002:= a0002-r0002
--E 14

```

```

--S 15 of 115
--d0002:= D(m0002,x)
--E 15

```

```

--S 16 of 115
t0003:= log(Gamma(a+b*x))
--R
--R
--R      -
--R (10) log(| (b x + a))
--R
--R                                          Type: Expression(Integer)
--E 16

```

```

--S 17 of 115
r0003:= x*log(Gamma(a+b*x))-x*logGamma(a+b*x)+Psi(-2,a+b*x)/b
--R
--R      There are 2 exposed and 0 unexposed library operations named
--R      logGamma having 1 argument(s) but none was determined to be
--R      applicable. Use HyperDoc Browse, or issue
--R      )display op logGamma

```

```

--R      to learn more about the available operations. Perhaps
--R      package-calling the operation or using coercions on the arguments
--R      will allow you to apply the operation.
--R
--R      Cannot find a definition or applicable library operation named
--R      logGamma 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 17

--S 18 of 115
a0003:= integrate(t0003,x)
--R
--R
--R      x
--R      ++      -
--R      (11)  | log(| (%K b + a))d%K
--R      ++
--R
--R                                          Type: Union(Expression(Integer),...)
--E 18

--S 19 of 115
--m0003:= a0003-r0003
--E 19

--S 20 of 115
--d0003:= D(m0003,x)
--E 20

--S 21 of 115
t0004:= x*log(Gamma(a+b*x))
--R
--R
--R      -
--R      (12)  x log(| (b x + a))
--R
--R                                          Type: Expression(Integer)
--E 21

--S 22 of 115
r0004:= 1/2*x^2*log(Gamma(a+b*x))-1/2*x^2*logGamma(a+b*x)-_
Psi(-3,a+b*x)/b^2+x*Psi(-2,a+b*x)/b
--R
--R      There are 2 exposed and 0 unexposed library operations named
--R      logGamma having 1 argument(s) but none was determined to be
--R      applicable. Use HyperDoc Browse, or issue
--R      )display op logGamma
--R      to learn more about the available operations. Perhaps
--R      package-calling the operation or using coercions on the arguments

```

```

--R      will allow you to apply the operation.
--R
--R      Cannot find a definition or applicable library operation named
--R      logGamma 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 22

--S 23 of 115
a0004:= integrate(t0004,x)
--R
--R
--R      x
--R      ++
--R      (13)  |  %K log(| (%K b + a))d%K
--R      ++
--R
--R      Type: Union(Expression(Integer),...)
--E 23

--S 24 of 115
--m0004:= a0004-r0004
--E 24

--S 25 of 115
--d0004:= D(m0004,x)
--E 25

--S 26 of 115
t0005:= x^2*log(Gamma(a+b*x))
--R
--R
--R      2
--R      (14)  x log(| (b x + a))
--R
--R      Type: Expression(Integer)
--E 26

--S 27 of 115
r0005:= 1/3*x^3*log(Gamma(a+b*x))-1/3*x^3*logGamma(a+b*x)+2*_
Psi(-4,a+b*x)/b^3-2*x*Psi(-3,a+b*x)/b^2+x^2*Psi(-2,a+b*x)/b
--R
--R      There are 2 exposed and 0 unexposed library operations named
--R      logGamma having 1 argument(s) but none was determined to be
--R      applicable. Use HyperDoc Browse, or issue
--R      )display op logGamma
--R      to learn more about the available operations. Perhaps
--R      package-calling the operation or using coercions on the arguments
--R      will allow you to apply the operation.
--R

```

```

--R      Cannot find a definition or applicable library operation named
--R      logGamma 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 27

--S 28 of 115
a0005:= integrate(t0005,x)
--R
--R
--R      x
--R      ++  2  _
--R      (15) | %K log(| (%K b + a))d%K
--R      ++
--R
--R      Type: Union(Expression(Integer),...)
--E 28

--S 29 of 115
--m0005:= a0005-r0005
--E 29

--S 30 of 115
--d0005:= D(m0005,x)
--E 30

--S 31 of 115
t0006:= logGamma(a+b*x)
--R
--R      There are 2 exposed and 0 unexposed library operations named
--R      logGamma having 1 argument(s) but none was determined to be
--R      applicable. Use HyperDoc Browse, or issue
--R      )display op logGamma
--R      to learn more about the available operations. Perhaps
--R      package-calling the operation or using coercions on the arguments
--R      will allow you to apply the operation.
--R
--R      Cannot find a definition or applicable library operation named
--R      logGamma 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 31

--S 32 of 115
r0006:= Psi(-2,a+b*x)/b
--R
--R      There are no library operations named Psi

```



```

--R      Use HyperDoc Browse or issue
--R      )what op Psi
--R      to learn if there is any operation containing " Psi " in its
--R      name.
--R      Cannot find a definition or applicable library operation named Psi
--R      with argument type(s)
--R      Integer
--R      Polynomial(Integer)
--R      Perhaps you should use "@" to indicate the required return type,
--R      or "$" to specify which version of the function you need.
--E 32

--S 33 of 115
--a0006:= integrate(t0006,x)
--E 33

--S 34 of 115
--m0006:= a0006-r0006
--E 34

--S 35 of 115
--d0006:= D(m0006,x)
--E 35

--S 36 of 115
t0007:= x*logGamma(a+b*x)
--R
--R      There are 2 exposed and 0 unexposed library operations named
--R      logGamma having 1 argument(s) but none was determined to be
--R      applicable. Use HyperDoc Browse, or issue
--R      )display op logGamma
--R      to learn more about the available operations. Perhaps
--R      package-calling the operation or using coercions on the arguments
--R      will allow you to apply the operation.
--R      Cannot find a definition or applicable library operation named
--R      logGamma with argument type(s)
--R      Polynomial(Integer)
--R      Perhaps you should use "@" to indicate the required return type,
--R      or "$" to specify which version of the function you need.
--E 36

--S 37 of 115
r0007:= -(Psi(-3,a+b*x)-x*Psi(-2,a+b*x)*b)/b^2
--R
--R      There are no library operations named Psi
--R      Use HyperDoc Browse or issue

```

```

--R                                     )what op Psi
--R   to learn if there is any operation containing " Psi " in its
--R   name.
--R
--R   Cannot find a definition or applicable library operation named Psi
--R   with argument type(s)
--R                                     Integer
--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 37

--S 38 of 115
--a0007:= integrate(t0007,x)
--E 38

--S 39 of 115
--m0007:= a0007-r0007
--E 39

--S 40 of 115
--d0007:= D(m0007,x)
--E 40

--S 41 of 115
t0008:= x^2*logGamma(a+b*x)
--R
--R   There are 2 exposed and 0 unexposed library operations named
--R   logGamma having 1 argument(s) but none was determined to be
--R   applicable. Use HyperDoc Browse, or issue
--R                                     )display op logGamma
--R   to learn more about the available operations. Perhaps
--R   package-calling the operation or using coercions on the arguments
--R   will allow you to apply the operation.
--R
--R   Cannot find a definition or applicable library operation named
--R   logGamma 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 41

--S 42 of 115
r0008:= 2*Psi(-4,a+b*x)/b^3-2*x*Psi(-3,a+b*x)/b^2+x^2*Psi(-2,a+b*x)/b
--R
--R   There are no library operations named Psi
--R   Use HyperDoc Browse or issue
--R                                     )what op Psi

```

```

--R      to learn if there is any operation containing " Psi " in its
--R      name.
--R
--R      Cannot find a definition or applicable library operation named Psi
--R      with argument type(s)
--R
--R              Integer
--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 42

--S 43 of 115
--a0008:= integrate(t0008,x)
--E 43

--S 44 of 115
--m0008:= a0008-r0008
--E 44

--S 45 of 115
--d0008:= D(m0008,x)
--E 45

--S 46 of 115
t0009:= x*Psi(n,a+b*x)
--R
--R      There are no library operations named Psi
--R      Use HyperDoc Browse or issue
--R              )what op Psi
--R      to learn if there is any operation containing " Psi " in its
--R      name.
--R
--R      Cannot find a definition or applicable library operation named Psi
--R      with argument type(s)
--R
--R              Variable(n)
--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 46

--S 47 of 115
r0009:= (-Psi(-2+n,a+b*x)+x*Psi(-1+n,a+b*x)*b)/b^2
--R
--R      There are no library operations named Psi
--R      Use HyperDoc Browse or issue
--R              )what op Psi
--R      to learn if there is any operation containing " Psi " in its
--R      name.

```

```

--R
--R Cannot find a definition or applicable library operation named Psi
--R with argument type(s)
--R Polynomial(Integer)
--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 47

--S 48 of 115
--a0009:= integrate(t0009,x)
--E 48

--S 49 of 115
--m0009:= a0009-r0009
--E 49

--S 50 of 115
--d0009:= D(m0009,x)
--E 50

--S 51 of 115
t0010:= x^2*Psi(1,a+b*x)
--R
--R There are no library operations named Psi
--R Use HyperDoc Browse or issue
--R )what op Psi
--R to learn if there is any operation containing " Psi " in its
--R name.
--R
--R Cannot find a definition or applicable library operation named Psi
--R with argument type(s)
--R PositiveInteger
--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 51

--S 52 of 115
r0010:= (-2*x*logGamma(a+b*x)*b+2*Psi(-2,a+b*x)+x^2*Psi(a+b*x)*b^2)/b^3
--R
--R There are 2 exposed and 0 unexposed library operations named
--R logGamma having 1 argument(s) but none was determined to be
--R applicable. Use HyperDoc Browse, or issue
--R )display op logGamma
--R to learn more about the available operations. Perhaps
--R package-calling the operation or using coercions on the arguments
--R will allow you to apply the operation.

```

```

--R
--R Cannot find a definition or applicable library operation named
--R logGamma 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 52

--S 53 of 115
--a0010:= integrate(t0010,x)
--E 53

--S 54 of 115
--m0010:= a0010-r0010
--E 54

--S 55 of 115
--d0010:= D(m0010,x)
--E 55

--S 56 of 115
t0011:= x*Zeta(2,a+b*x)
--R
--R There are no library operations named Zeta
--R Use HyperDoc Browse or issue
--R )what op Zeta
--R to learn if there is any operation containing " Zeta " in its
--R name.
--R
--R Cannot find a definition or applicable library operation named Zeta
--R with argument type(s)
--R PositiveInteger
--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 56

--S 57 of 115
r0011:= (-logGamma(a+b*x)+x*Psi(a+b*x)*b)/b^2
--R
--R There are 2 exposed and 0 unexposed library operations named
--R logGamma having 1 argument(s) but none was determined to be
--R applicable. Use HyperDoc Browse, or issue
--R )display op logGamma
--R to learn more about the available operations. Perhaps
--R package-calling the operation or using coercions on the arguments
--R will allow you to apply the operation.
--R

```

```

--R Cannot find a definition or applicable library operation named
--R logGamma 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 57

--S 58 of 115
--a0011:= integrate(t0011,x)
--E 58

--S 59 of 115
--m0011:= a0011-r0011
--E 59

--S 60 of 115
--d0011:= D(m0011,x)
--E 60

--S 61 of 115
t0012:= x^2*Zeta(2,a+b*x)
--R
--R There are no library operations named Zeta
--R Use HyperDoc Browse or issue
--R )what op Zeta
--R to learn if there is any operation containing " Zeta " in its
--R name.
--R
--R Cannot find a definition or applicable library operation named Zeta
--R with argument type(s)
--R PositiveInteger
--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 61

--S 62 of 115
r0012:= (-2*x*logGamma(a+b*x)*b+2*Psi(-2,a+b*x)+x^2*Psi(a+b*x)*b^2)/b^3
--R
--R There are 2 exposed and 0 unexposed library operations named
--R logGamma having 1 argument(s) but none was determined to be
--R applicable. Use HyperDoc Browse, or issue
--R )display op logGamma
--R to learn more about the available operations. Perhaps
--R package-calling the operation or using coercions on the arguments
--R will allow you to apply the operation.
--R
--R Cannot find a definition or applicable library operation named

```

```

--R      logGamma 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 62

--S 63 of 115
--a0012:= integrate(t0012,x)
--E 63

--S 64 of 115
--m0012:= a0012-r0012
--E 64

--S 65 of 115
--d0012:= D(m0012,x)
--E 65

--S 66 of 115
t0013:= Zeta(s,a+b*x)
--R
--R      There are no library operations named Zeta
--R      Use HyperDoc Browse or issue
--R                               )what op Zeta
--R      to learn if there is any operation containing " Zeta " in its
--R      name.
--R
--R      Cannot find a definition or applicable library operation named Zeta
--R      with argument type(s)
--R                               Variable(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 66

--S 67 of 115
r0013:= -Zeta(-1+s,a+b*x)/b/(-1+s)
--R
--R      There are no library operations named Zeta
--R      Use HyperDoc Browse or issue
--R                               )what op Zeta
--R      to learn if there is any operation containing " Zeta " in its
--R      name.
--R
--R      Cannot find a definition or applicable library operation named Zeta
--R      with argument type(s)
--R                               Polynomial(Integer)
--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 67

--S 68 of 115
--a0013:= integrate(t0013,x)
--E 68

--S 69 of 115
--m0013:= a0013-r0013
--E 69

--S 70 of 115
--d0013:= D(m0013,x)
--E 70

--S 71 of 115
t0014:= x*Zeta(s,a+b*x)
--R
--R There are no library operations named Zeta
--R Use HyperDoc Browse or issue
--R )what op Zeta
--R to learn if there is any operation containing " Zeta " in its
--R name.
--R
--R Cannot find a definition or applicable library operation named Zeta
--R with argument type(s)
--R Variable(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 71

--S 72 of 115
r0014:= -Zeta(-2+s,a+b*x)/b^2/(1-s)/(2-s)+x*Zeta(-1+s,a+b*x)/b/(1-s)
--R
--R There are no library operations named Zeta
--R Use HyperDoc Browse or issue
--R )what op Zeta
--R to learn if there is any operation containing " Zeta " in its
--R name.
--R
--R Cannot find a definition or applicable library operation named Zeta
--R with argument type(s)
--R Polynomial(Integer)
--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 72

--S 73 of 115
--a0014:= integrate(t0014,x)
--E 73

--S 74 of 115
--m0014:= a0014-r0014
--E 74

--S 75 of 115
--d0014:= D(m0014,x)
--E 75

--S 76 of 115
t0015:= x^2*Zeta(s,a+b*x)
--R
--R      There are no library operations named Zeta
--R      Use HyperDoc Browse or issue
--R      )what op Zeta
--R      to learn if there is any operation containing " Zeta " in its
--R      name.
--R
--R      Cannot find a definition or applicable library operation named Zeta
--R      with argument type(s)
--R      Variable(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 115
r0015:= 2*Zeta(-3+s,a+b*x)/b^3/(1-s)/(2-s)/(3-s)-
2*x*Zeta(-2+s,a+b*x)/b^2/(1-s)/(2-s)+x^2*Zeta(-1+s,a+b*x)/b/(1-s)
--R
--R      There are no library operations named Zeta
--R      Use HyperDoc Browse or issue
--R      )what op Zeta
--R      to learn if there is any operation containing " Zeta " in its
--R      name.
--R
--R      Cannot find a definition or applicable library operation named Zeta
--R      with argument type(s)
--R      Polynomial(Integer)
--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 115
--a0015:= integrate(t0015,x)
--E 78

--S 79 of 115
--m0015:= a0015-r0015
--E 79

--S 80 of 115
--d0015:= D(m0015,x)
--E 80

--S 81 of 115
t0016:= polylog(n,a*x^m)/x
--R
--R   There are no library operations named polylog
--R   Use HyperDoc Browse or issue
--R   )what op polylog
--R   to learn if there is any operation containing " polylog " in its
--R   name.
--R
--R   Cannot find a definition or applicable library operation named
--R   polylog with argument type(s)
--R   Variable(n)
--R   Expression(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 115
r0016:= polylog(1+n,a*x^m)/m
--R
--R   There are no library operations named polylog
--R   Use HyperDoc Browse or issue
--R   )what op polylog
--R   to learn if there is any operation containing " polylog " in its
--R   name.
--R
--R   Cannot find a definition or applicable library operation named
--R   polylog with argument type(s)
--R   Polynomial(Integer)
--R   Expression(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 115
--a0016:= integrate(t0016,x)
--E 83

--S 84 of 115
--m0016:= a0016-r0016
--E 84

--S 85 of 115
--d0016:= D(m0016,x)
--E 85

--S 86 of 115
t0017:= polylog(2,a+b*x)
--R
--R There are no library operations named polylog
--R Use HyperDoc Browse or issue
--R )what op polylog
--R to learn if there is any operation containing " polylog " in its
--R name.
--R
--R Cannot find a definition or applicable library operation named
--R polylog with argument type(s)
--R PositiveInteger
--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 115
r0017:= -x-(1-a-b*x)*log(1-a-b*x)/b+(x+a/b)*polylog(2,a+b*x)
--R
--R There are no library operations named polylog
--R Use HyperDoc Browse or issue
--R )what op polylog
--R to learn if there is any operation containing " polylog " in its
--R name.
--R
--R Cannot find a definition or applicable library operation named
--R polylog with argument type(s)
--R PositiveInteger
--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 115
--a0017:= integrate(t0017,x)

```

```

--E 88

--S 89 of 115
--m0017:= a0017-r0017
--E 89

--S 90 of 115
--d0017:= D(m0017,x)
--E 90

--S 91 of 115
t0018:= polylog(n,a*f^x)
--R
--R   There are no library operations named polylog
--R   Use HyperDoc Browse or issue
--R   )what op polylog
--R   to learn if there is any operation containing " polylog " in its
--R   name.
--R
--R   Cannot find a definition or applicable library operation named
--R   polylog with argument type(s)
--R   Variable(n)
--R   Expression(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 115
r0018:= polylog(1+n,a*f^x)/log(f)
--R
--R   There are no library operations named polylog
--R   Use HyperDoc Browse or issue
--R   )what op polylog
--R   to learn if there is any operation containing " polylog " in its
--R   name.
--R
--R   Cannot find a definition or applicable library operation named
--R   polylog with argument type(s)
--R   Polynomial(Integer)
--R   Expression(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 115
--a0018:= integrate(t0018,x)
--E 93

```

```

--S 94 of 115
--m0018:= a0018-r0018
--E 94

--S 95 of 115
--d0018:= D(m0018,x)
--E 95

--S 96 of 115
t0019:= x*polylog(n,a*f^x)
--R
--R   There are no library operations named polylog
--R   Use HyperDoc Browse or issue
--R   )what op polylog
--R   to learn if there is any operation containing " polylog " in its
--R   name.
--R
--R   Cannot find a definition or applicable library operation named
--R   polylog with argument type(s)
--R   Variable(n)
--R   Expression(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 115
r0019:= 1/log(f)^2*(x*polylog(1+n,a*f^x)*log(f)-polylog(2+n,a*f^x))
--R
--R   There are no library operations named polylog
--R   Use HyperDoc Browse or issue
--R   )what op polylog
--R   to learn if there is any operation containing " polylog " in its
--R   name.
--R
--R   Cannot find a definition or applicable library operation named
--R   polylog with argument type(s)
--R   Polynomial(Integer)
--R   Expression(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 115
--a0019:= integrate(t0019,x)
--E 98

--S 99 of 115
--m0019:= a0019-r0019

```

```

--E 99

--S 100 of 115
--d0019:= D(m0019,x)
--E 100

--S 101 of 115
t0020:= x^2*polylog(n,a*f^x)
--R
--R   There are no library operations named polylog
--R   Use HyperDoc Browse or issue
--R   )what op polylog
--R   to learn if there is any operation containing " polylog " in its
--R   name.
--R
--R   Cannot find a definition or applicable library operation named
--R   polylog with argument type(s)
--R   Variable(n)
--R   Expression(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 115
r0020:= 1/log(f)^3*(x^2*polylog(1+n,a*f^x)*log(f)^2-_
2*x*polylog(2+n,a*f^x)*log(f)+2*polylog(3+n,a*f^x))
--R
--R   There are no library operations named polylog
--R   Use HyperDoc Browse or issue
--R   )what op polylog
--R   to learn if there is any operation containing " polylog " in its
--R   name.
--R
--R   Cannot find a definition or applicable library operation named
--R   polylog with argument type(s)
--R   Polynomial(Integer)
--R   Expression(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 115
--a0020:= integrate(t0020,x)
--E 103

--S 104 of 115
--m0020:= a0020-r0020
--E 104

```

```

--S 105 of 115
--d0020:= D(m0020,x)
--E 105

--S 106 of 115
t0021:= log(x)*polylog(n,a*x)/x
--R
--R   There are no library operations named polylog
--R   Use HyperDoc Browse or issue
--R   )what op polylog
--R   to learn if there is any operation containing " polylog " in its
--R   name.
--R
--R   Cannot find a definition or applicable library operation named
--R   polylog with argument type(s)
--R   Variable(n)
--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 115
r0021:= log(x)*polylog(1+n,a*x)-polylog(2+n,a*x)
--R
--R   There are no library operations named polylog
--R   Use HyperDoc Browse or issue
--R   )what op polylog
--R   to learn if there is any operation containing " polylog " in its
--R   name.
--R
--R   Cannot find a definition or applicable library operation named
--R   polylog with argument type(s)
--R   Polynomial(Integer)
--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 115
--a0021:= integrate(t0021,x)
--E 108

--S 109 of 115
--m0021:= a0021-r0021
--E 109

--S 110 of 115

```

```

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

--S 111 of 115
t0022:= log(x)^2*polylog(n,a*x)/x
--R
--R There are no library operations named polylog
--R Use HyperDoc Browse or issue
--R )what op polylog
--R to learn if there is any operation containing " polylog " in its
--R name.
--R
--R Cannot find a definition or applicable library operation named
--R polylog with argument type(s)
--R Variable(n)
--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 115
r0022:= log(x)^2*polylog(1+n,a*x)-2*log(x)*polylog(2+n,a*x)+2*polylog(3+n,a*x)
--R
--R There are no library operations named polylog
--R Use HyperDoc Browse or issue
--R )what op polylog
--R to learn if there is any operation containing " polylog " in its
--R name.
--R
--R Cannot find a definition or applicable library operation named
--R polylog with argument type(s)
--R Polynomial(Integer)
--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 112

--S 113 of 115
--a0022:= integrate(t0022,x)
--E 113

--S 114 of 115
--m0022:= a0022-r0022
--E 114

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

```


)spool

References

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