
Subject: Re: `bessel`

Posted by [Michael Kueppers](#) on Fri, 05 Nov 1999 08:00:00 GMT

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enea wrote:

- > I have to calculate the modified Bessel functions `K(y)`.
- > I'm not able to do it in `idl`.
- > Someone can help me?
- >
- > Excuse me for my bad english
- >
- > Claudia

The `IDL`-functions below are the Bessel-functions `K_0(y)` and `K_1(y)` taken from "Numerical Recipes in C" (Press et al. 1992, Cambridge Univ. Press) and translated to the Interactive Data Language. Should your question refer to the other `idl` (I am sufficiently ignorant not to know if this is a possibility), please apologize for bothering. You can construct higher order `bessel` functions by

$$-2n / x * K_n(x) = K_{(n-1)}(x) - K_{(n+1)}(x)$$

Best wishes,
Michael

```
FUNCTION beselk0,X,z
; Compute the modified Bessel-function of second kind and zeroth order
;                                     M.K., 1.5.97
; Completely changed: now taken from "Numerical recipes in C", Press et al.,
; 1992, and translated from C to IDL.
;                                     M.K., 2.5.97
; Corection in case that X is a vector. Also, dummy variable z added to allow
function for INT_2d
;                                     M.K., 14.7.99
```

```
ans = X
FOR I =0,(N_ELEMENTS(X)-1) DO BEGIN
If X(I) LE 2. THEN BEGIN
    Y = X(I)*X(I)/4.
    ans(I) = (-alog(X(I)/2.)*BESELI(X(I),0)) + (-0.57721566 + Y*(0.42278420 +$
        Y*(0.23069756 + Y*(0.03488590 + Y*(0.262698e-2 + $
```

```

        Y*(0.10750e-3 + Y*0.74e-5))))))
ENDIF ELSE BEGIN
    Y = 2.0/X(I)
    ans(I) = (EXP(-X(I))/SQRT(X(I)))*(1.25331414 + Y*(-0.07832358 + $
        Y*(0.02189568 + Y*(-0.01062446 + Y*(0.587872e-2 + $
        Y*(-0.251540e-2 + Y*0.53208E-3))))))
ENDELSE
ENDFOR

```

```

RETURN, ans

```

```

END

```

```

FUNCTION beselk1,X
; Compute the modified Bessel-function of second kind and first order
; Taken from "Numerical recipes in C", Press et al.,
; 1992, and translated from C to IDL.
;
; M.K., 14.7.99

```

```

ans = X
FOR I =0,(N_ELEMENTS(X)-1) DO BEGIN
    If X(I) LE 2. THEN BEGIN
        Y = X(I)*X(I)/4.
        ans(I) = (alog(X(I)/2.)*BESELI(X(I),1)) + $
        (1./X(I))*(1.+Y*(0.15443144+Y*(-0.67278579+Y*(-0.18156897+Y* (-0.01919402+Y*$
        (-0.00110404+Y*(4.686e-5)))))))))
    ENDIF ELSE BEGIN
        Y = 2.0/X(I)
        ans(I) = (EXP(-X(I))/SQRT(X(I)))*(1.25331414 +
        Y*(0.23498619+Y*(-0.03655620+Y*(0.01504268+Y*(-0.00780353+y* (0.00325614+Y*$
        (-0.00068245)))))))))
    ENDELSE
ENDFOR

```

```

RETURN, ans

```

```

END

```

```

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```