5. Bessel Function I, Series Expansion

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comment     Compute the Bessel function I_n (X) when n and X
            are within the bounds of the series expansion.
            The procedure calling statement gives n, X and an
            absolute tolerance δ for determining the point at
            which the terms of the summation become insig-
            nificant. Special case: I_0(0) = 1;
procedure   I(n, X, δ) = : (Is)
begin
I:          s := 0  ;  sum := 0
if          (n ≠ 0)  ;  go to STRT
if          (X = 0)  ;  begin Is := 1  ;  return end
            summ := 1  ;  go to SURE
STRT:       sfac := 1
if          (s = 0)  ;  go to HRE
for         t := 1 (1) s
            sfac := sfac × t
HRE:        snfac := sfac
for         t := s + 1 (1) s + n
            snfac := snfac × t
            summ := sum + (X/2)^(n+2×s)/(sfac × snfac)
SURE: if    (δ < abs (summ − sum))
begin       s := s + 1  ;  sum := summ  ;  go to STRT end
            Is := summ  ;  return
end
```