

## Supplement to The Second-Order Sharpening of Blurred Smooth Borders

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FUNCTION BINT(SIGMA, T, OK)
C COMPUTES, AS *BINT*, 3/(T(4)-T(1)) TIMES THE INTEGRAL, FROM -SIGMA
C TO INFINITY, OF THE (USUAL) QUADRATIC B-SPLINE BASED ON THE KNOTS
C T(1), ..., T(4). *OK* IS SET .TRUE. UNLESS THE KNOTS ARE ORDERED
C WRONG OR T(1) IS TOO CLOSE TO T(4). NOVEMBER, 1987.
C FOR MORE DETAILS, SEE APPENDIX 4 OF THE ABOVE PAPER.
  DIMENSION T(4), Z(4), ZM(4)
  LOGICAL OK
  S=-SIGMA
  DO 1 I=1, 4
    ZM(I)=ABS(T(I))
  1 Z(I)=T(I)
C CHECK IF KNOTS IN RIGHT ORDER, AND SET EQUAL IF TOO CLOSE.
  ROUND=1.E-10*AMAX1(ZM(1), ZM(2), ZM(3), ZM(4))
  OK=.FALSE.
  HP=Z(4)-Z(3)
  IF(HP.GE.-ROUND) GO TO 3
  RETURN
  3 IF(HP.LE.ROUND) HP=0.
  H0=Z(3)-Z(2)
  IF(H0.GE.-ROUND) GO TO 4
  RETURN
  4 IF(H0.LE.ROUND) H0=0.
  HM=Z(2)-Z(1)
  IF(HM.GE.-ROUND) GO TO 5
  RETURN
  5 IF(HM.LE.ROUND) HM=0.
  H=HP+H0+HM
  IF(H.GT.3.*ROUND) GO TO 6
  RETURN
C IF *S* NOT IN (Z(1), Z(4)), SET INTEGRAL TO ZERO OR ONE APPROPRIATELY.
  6 OK=.TRUE.
  HOP=H0+HP
  HOM=H0+HM
  BINT=0.
  IF(S.GE.Z(4)) RETURN
  IF(S.GT.Z(1)) GO TO 2
  BINT=1.
  RETURN
C *S* IS STRICTLY BETWEEN *Z(1)* AND *Z(4)*. COMPUTE (3/H)*(INTEGRAL
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C OF THE QUADRATIC B-SPLINE (WITH KNOTS *Z*) FROM *S* TO *Z(4)*.
C FIRST, COMPUTE AND ADD THE CONTRIBUTION FROM (Z(3), Z(4)).
  2 SUM=0.
    IF(HP.EQ.0.) GO TO 7
    FAC=HP**2/(24.*HOP)
    IF(S.GE.Z(3)) GO TO 8
    SUM=SUM+8.*FAC
    GO TO 7
  8 SNOR=(2.*S-(Z(4)+Z(3)))/HP
    SUM=SUM+FAC*(1.-SNOR)**3
    GO TO 11
C COMPUTE AND ADD THE CONTRIBUTION FROM (Z(2), Z(3)).
  7 IF(HO.EQ.0.) GO TO 9
    X=((Z(2)+Z(3))-2.*Z(1))/HO
    Y=(2.*Z(4)-(Z(2)+Z(3)))/HO
    FAC=HO**3/(16.*HOP*HOM)
    IF(S.GE.Z(2)) GO TO 10
    SUM=SUM+FAC*4.*(-1.+X+Y+3.*X*Y)/3.
    GO TO 9
  10 SNOR=(2.*S-(Z(3)+Z(2)))/HO
    SUM=SUM+FAC*(1.-SNOR)*((X+Y+2.*X*Y)+(Y-X)*(1.+SNOR)
    1-(2.+X+Y)*(1.+SNOR+SNOR**2)/3.)
    GO TO 11
C COMPUTE AND ADD THE CONTRIBUTION FROM (Z(1), Z(2)).
  9 IF(HM.EQ.0.) GO TO 11
    FAC=HM**2/(24.*HOM)
    SNOR=(2.*S-(Z(2)+Z(1)))/HM
    SUM=SUM+FAC*(1.-SNOR)*(7.+SNOR*(4.+SNOR))
  11 BINT=SUM*3./H
    RETURN
    END

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