Algorithm 1 Raw adaptive simpson algorithm

Input endpoints a,b; tolerance TOL; limit N to number of levels.

Output approximation APP which is the integrate result.

function ADAPSIMPSON(f,a,b,tol)
    $c = (a + b)/2$
    $c1 = (a + c)/2$
    $c2 = (a + c)/2$
    $Sab = 1/6 * (b - a) * (f(a) + 4 * f(c) + f(b))$
    $Sac = 1/6 * (c - a) * (f(a) + 4 * f(c1) + f(c))$
    $Scb = 1/6 * (b - c) * (f(c) + 4 * f(c2) + f(b))$
    $e = abs(Sab - Sac - Scb)/15$
    if $e < tol$ **then**
        $q = Sac + Scb; x = [a; c1; c; c2; b]$
        return
    else
        $[qac, eac, xac] = ADAPSIMPSON(f, a, c, tol/2)$
        $[qcb, ecb, xcb] = ADAPSIMPSON(f, c, b, tol/2)$
        $q = qac + qcb$
        $e = eac + ecb$
        $x = [xac(1 : (end - 1)); xcb]$
    end if
end function