Secant

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October 21, 2015

Algorithm 1 Secant

procedure SECANT
  $tol, x_0, x_1, niter$
  $fx_0 = f(x_0)$
  if $fx_0 = 0$ **then**
    X_0 *is a root*
  else
    $fx_1 = f(x_1)$
    $cont = 0$
    $error = tol + 1$
    $den = fx_1 - fx_0$
    while $error > tol$ and $fx_1 \neq 0$ and $den \neq 0$ and $cont < niter$ **do**
      $x_2 = x1 - \frac{fx_1 * (x_1 - x_0)}{den}$
      $error = |x_2 - x_1|$
      $x_0 = x_1$
      $fx_0 = fx_1$
      $x1 = x2$
      $f_x1 = f(x_1)$
      $den = f_x1 - f_x0$
      $cont = cont + 1$
    end while
    if $f_x1 = 0$ **then**
      x_1 *is a root*
    else if $error < tol$ **then**
      X_1 *is an approximation with a tolerance* $= tol$
    else if $den = 0$ **then**
      There is a possible multiple root
    else
      Fail after niter iterations
    end if
  end if
end procedure