Midpoint method

The midpoint method can be thought of as an extension to Euler’s method like other methods used in this document. Just as Euler’s method uses *n* different sections to approximate the target equation, again . (ASSUMING H AAS ALREADY BEEN EXPLAINED FOR EULERS IF NOT CAN ADD WHERE H IS EQUAL TO…) However, where Euler’s method uses the gradient of the smallest *x* value () of each section for the approximation, Midpoint uses the gradient of the midpoint. Giving the following general iterative formula:

Which we can rewrite as

Where

Figure (XXYYXX) shows how this was achieved within MATLAB. Commented out is the code used for Euler’s method to show the similarities between the two methods. (ASSUMING the main body of Euler’s has been explained). The only differences are the updated value of to find the gradiant at the midpoint.

