

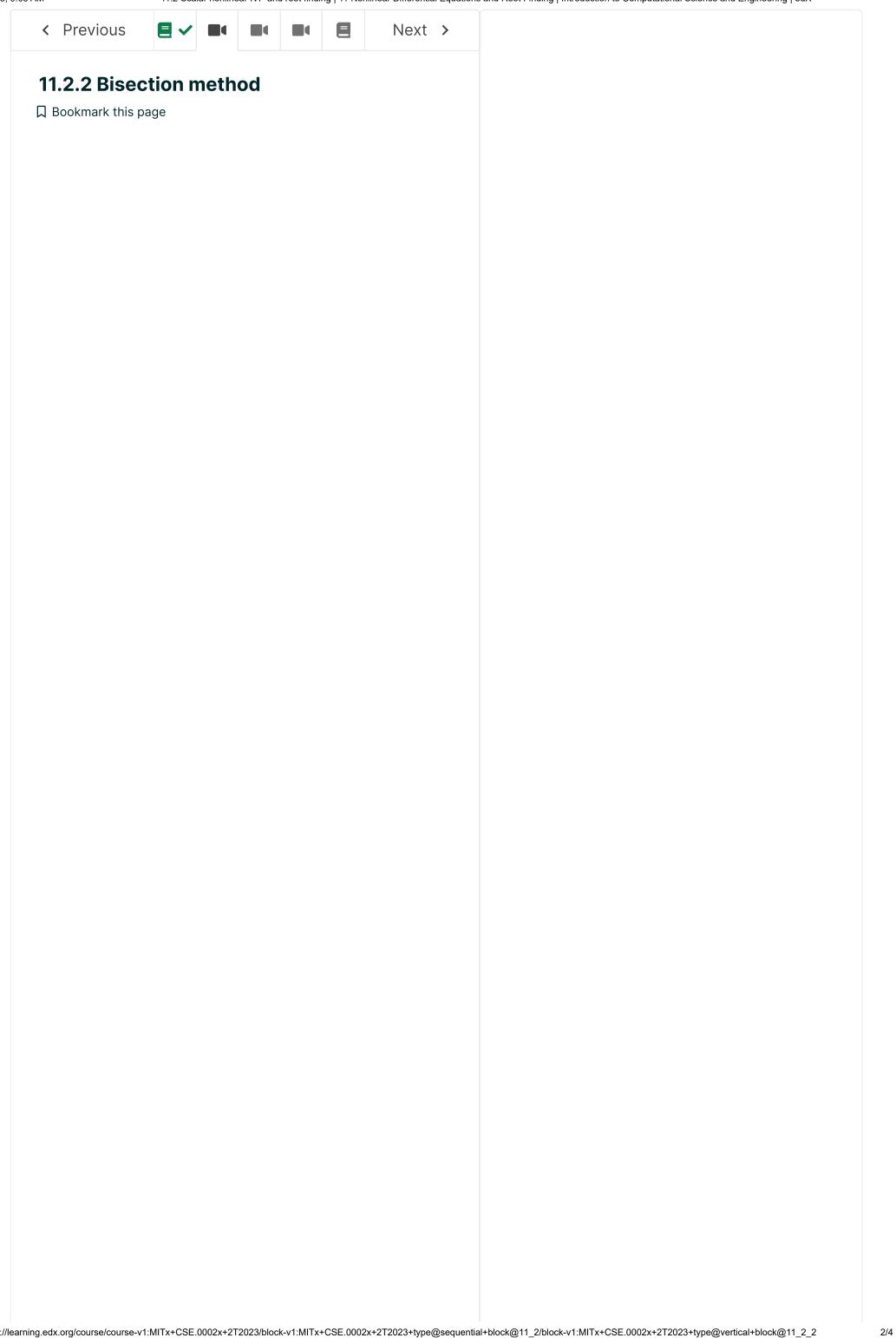
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☆ Course / 11 Nonlinear Differential Equations and R... / 11.2 Scalar nonlinear IVP and ro...





MO2.10

One of the most common methods for root finding in a scalar equation is the bisection method. The bisection methods starts from two points a^0 and b^0 such that either

$$r\left(a^{0}
ight)>0, \qquad ext{and} \qquad r\left(b^{0}
ight)<0.$$

or

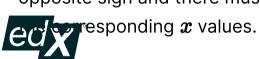
$$r\left(a^{0}
ight)<0, \qquad ext{and} \qquad r\left(b^{0}
ight)>0.$$

When r is continous, there must exist a root in the interval $[a^0,b^0]$. At stage k, assume that we have obtained an interval $[a^k,b^k]$ such that the same sign properties hold, i.e. $r(a^k)$ and $r(b^k)$ have opposite signs. The bisection method consists in subdividing the interval $[a^k,b^k]$ in two and keeping the half in which there must be a root. Let $m^k=(a^k+b^k)/2$. The key concept to deciding which half to keep is to determine whether $r(m^k)$ has the opposite sign as $r(a^k)$ or $r(b^k)$. This can be done by multiplying $r(a^k)r(m^k)$ and $r(b^k)r(m^k)$ and checking the signs of these multiplications. When the sign is negative, then the corresponding r values have the opposite sign and there must still be a root between

Discussions

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Here's the bisection algorithm based upon this

edixept:

About $r(a^k) r(m^k) > 0$, then it is the interval Affiliates $p(a^k) r(m^k) > 0$, then it is the interval edx for Business $p(a^k) r(m^k) > 0$, then it is the interval $p(a^k) r(m^k) > 0$, then it is the interval $p(a^k) r(m^k) > 0$, then it is the interval $p(a^k) r(m^k) > 0$, then it is the interval $p(a^k) r(m^k) > 0$, then it is the interval $p(a^k) r(m^k) > 0$, then it is the interval $p(a^k) r(m^k) > 0$, then it is the interval $p(a^k) r(m^k) > 0$, then it is the interval $p(a^k) r(m^k) > 0$, then it is the interval $p(a^k) r(m^k) > 0$, then it is the interval $p(a^k) r(m^k) > 0$, then it is the interval $p(a^k) r(m^k) > 0$, then it is the interval $p(a^k) r(m^k) > 0$, then it is the interval $p(a^k) r(m^k) r(m^k) > 0$, then it is the interval $p(a^k) r(m^k) r(m^k) > 0$, then it is the interval $p(a^k) r(m^k) r(m^k) = 0$.

Careers $(a^k) \, r \, (m^k) < 0$, then it is the interval $[a^k, m^k]$ which is of interest. We put $a^{k+1} = a^k$

Legal $b^{k+1}=m^k$.

Ternifo $n(m^k)$ ri (m^k) Hen 0, then m^k is a root and we Privatop the algorithm.

Accessibility Policy

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Video on bisection method and its application

Start of

