Re: bound on eigenvalues...

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- *From*: Robert Low <mtx014@xxxxxxxxxxxxxx>

- *Date*: Wed, 07 Dec 2005 20:49:32 +0000

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comtech wrote:

      Robert Low wrote:

            José Carlos Santos wrote:

                  The eigenvalues are the roots of the characteristic polynomial, which is
                  P(x) = −x^3 + a x^2 + b x + c, with a = 0.501, b = −0.024089, and
                  c = 0.0000524046. Since it's a third degree polynomial, it can't have
                  more than three roots. Now, since P(0) = 0.0000524046, P(0.05) =
                  −0.0000245449, P(0.1) = 0.00165351, P(0.4) = 0.00657681, and P(0.5) =
                  −0.0117421, there must be a root between 0 and 0.1, a second one between
                  0.1 and 0.4, and a third one between 0.4 and 0.5. This proves that all
                  roots are smaller than 0.5.

            But I think he *meant* to write that there must be a root
            between 0 and 0.05, a second one between 0.05 and 0.1,
            and a third one between 0.4  and 0.5, since that's how the
            sign changes go.

      But these approaches look like numerical... it is perfectly OK for
      practice ... but here we need analytical methods...


No. Once you know that that a function is continuous on [a,b]
and takes on opposite signs at a and b, the intermediate
value theorem tells you that it is zero at some point
between a and b. You can use estimates of the value of the
function (with known errors) to guarantee the sign change.



It's all analysis, but some of it involves numbers.
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