How do you like my centrifuge, Mister Bond? When I turn this lever, you will feel centrifugal force crush every bone in your body.

You mean centrifugal force? There's no such thing as centrifugal force.

A laughable claim, Mister Bond, perpetuated by misguided teachers of science. Simply constrain Newton's laws in a rotating system, and you will see a centrifugal force tear apart as plain as day.

Come now, do you really expect me to do coordinate substitution in my head while strapped to a centrifuge?

No, Mister Bond, I expect you to die.

http://xkcd.com/123/
Announcements

• I found some practice exams/solutions and review sheets! Posted on our Baskin page / Piazza.
  • not written by me, but should be helpful anyway

• Last homework will be due next Friday (12/12)!

• Doodle poll up for scheduling a review session during finals week (link on Baskin page)
A system of differential equations has the following set of three eigenvalues:

\[-0.3, 0.5 \pm 0.5i\]

What is the long-term behavior of the system?

A: Unbounded growth

B: Decay towards 0

C: Approach to a steady state

Answer - A: In this case we’re dealing with a continuous system so the eigenvalues appear in the exponents \(\exp(\lambda t)\) in our solutions (as opposed to discrete systems where we look at \(\lambda^k\)). Long-term behavior is determined by the behavior of those factors as \(t\) goes to infinity. For the first eigenvalue, \(\exp(-0.3t)\) goes to 0. The second eigenvalue has \(\exp((0.5 + 0.5i)t) = \exp(0.5t)(\cos(0.5t) + i\sin(0.5t))\) which grows without bound as \(t\) increases. Therefore the overall solution exhibits unbounded growth in the long-term.