Math 23 Diff Eq: Homework 4

due Wed Oct 19

Five of these are postponed from HW3. Sections 3.6 and 3.7 are the key parts to focus on this week, and might require a bit more time—be sure to attack them early!

3.5: 3, 14, 16, 21 (nice intuitive way to see why te^{rt} arises).

The next section suddenly involves more messy algebra (be prepared to keep track of lots of terms; use abbreviations to help, *e.g.* s and c for $\sin \beta t$ and $\cos \beta t$). The results are worth it though!

3.6: 1 (is e^{2t} a homog soln?), 2, 3 (is e^{-t} a homog soln? Use this info), 4, 14.

The next technique is equally crucial, but mainly boild down to evaluating two integrals each time:

3.7: 3 (important to get the two methods to agree—isn't it amazing how the t^2 term emerges from variation of parameters?),

5 (look in integral table),

11 (simplify as much as you can),

13 (don't forget you can remove multiples of y_1 and y_2, the homog solns, in the answer, and careful chooseing lower limit t_0),

23 (beautiful result for response of driven harmonic oscillator).

3.8: 1, 7, 12, 18.

3.9: 1, 17 (plot can be replaced by sketch but be sure to label some values, width/height of peak, etc)