Topics in Mathematical Physics (PHYS 320): 4

Spring 2019

Read: Boas Chapter 8 Section 5

(1) In our solution for the general raindrop -
   (a) Show that the solutions for $u(m)$ and $v(m)$ are correct. Use integrating factors to find $u(m)$.
   (b) What is the raindrop's acceleration if the drop accumulates mass by accretion on its surface. Hint: $\alpha = 2/3$ and $\beta = 0$.

(2) More slope fields with mathematica:
   (a) Explore the solution space of
   $$u'(x) = u + \cos x$$
   by plotting the slope field on a domain of $(-4, 4)$.
   (b) Find specific solutions to the differential equation using DSolve for $y(2) = 3$ and $y(2) = -0.416$.
   (c) Plot these solutions and your slope field in one plot using Show.
   (d) Comment on your results.