ECSE/CSDS/EMAE 489
Problem Set 8: Trajectory Planning
Assigned: 4/1/21
Due: 4/8/21

Starter code will be provided for a planar, 2DOF arm. You will only need to edit the function: **plan_xy_velocities.m**. You can change the arguments to this function, if desired, but it must return a velocity plan with a fixed time step, DT. (vy will always be zero, for this example, but vx will vary as a function of time).

The objective is to plan a viable trajectory for the arm to move from x_start to x_end at fixed value of y. The plan you present must satisfy the following constraints:

- all joint velocities must be within their defined limits
- all joint torques must be within their defined limits
- the arm must start from rest and end at rest (velocities=0)

The example provided does satisfy keeping the joint velocities and the joint torques within their constraints, but it requires 20 seconds to complete the path. Your result should be faster.

Prove (from figures 5 and 7 in the starter code) that your solution obeys the joint-velocity and joint-torque constraints.

State your arm arrival time.

Grading for this question will be based on the following. Documenting a legal (constraint-satisfying) velocity profile that is faster than the example gets half the points. The remaining points will be based on rank-ordering your speed among the class answers. The fastest (legal) time will receive "**challenge**" extra credit.

Deliverables:

Include a description of your approach to your solutions. Include your code (presumably in Matlab). Include your plots, documenting the viability of your trajectory plan. All members of a group will submit the same solution (redundantly). Don't forget to enter your group/self rankings with your submission.