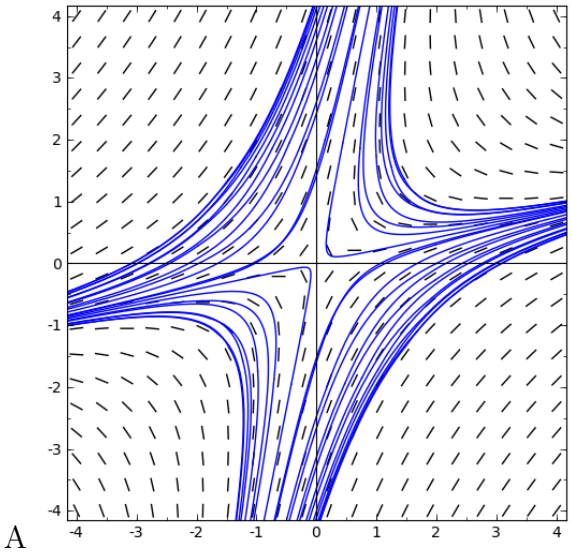
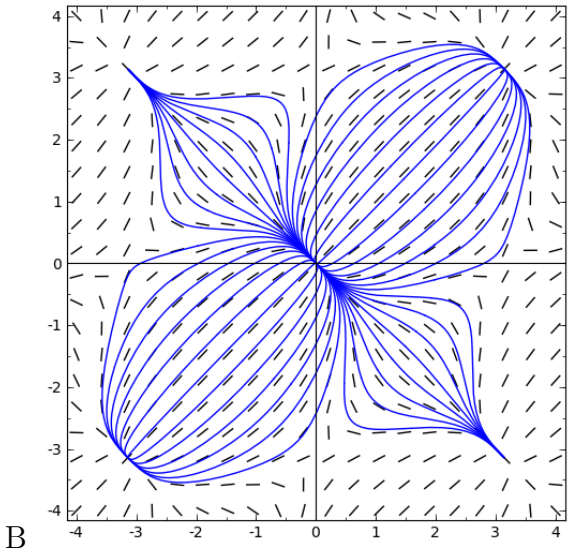
Math 3280 Assignment 13; ungraded but recommended.

(1) Compute the Laplace transform of the sawtooth function $f(t) = t - \lfloor t \rfloor$ where $\lfloor t \rfloor$ is the *floor* function. The floor of t is the largest integer less than or equal to t. For example, $\lfloor 2.6 \rfloor = 2$.

(2) Compute the critical points of the following nonlinear differential equations, and use that information to match each equation with a trajectory plot from the following page.
   (a) $x' = x - y$, $y' = x + 3y - 4$.
   (b) $x' = 2x - y$, $y' = x - 3y$.
   (c) $x' = 2\sin(x) + \sin(y)$, $y' = \sin(x) + 2\sin(y)$.
   (d) $x' = x - 2y$, $y' = -x^3 + 4x$.
   (e) $x' = 1 - y^2$, $y' = x + 2y$.
   (f) $x' = x - 2y + 3$, $y' = x - y + 2$.

(3) Find the unique critical point of the system $x' = x - y$, $y' = 5x - 3y - 2$. Compute the eigenvalues of its linearization to determine the stability of the critical point (see Theorem 2 in section 9.2).


A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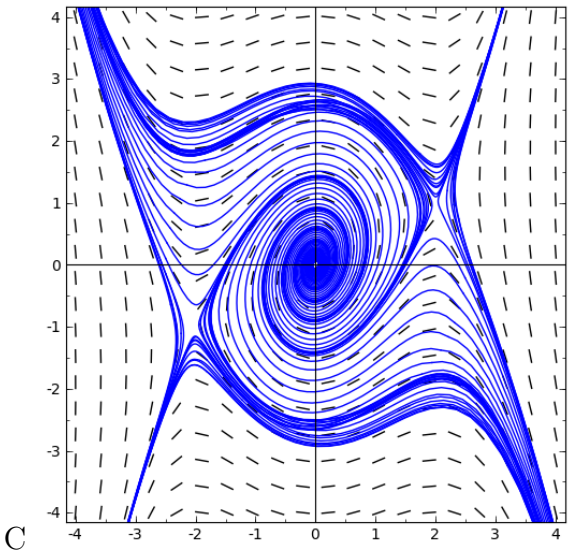
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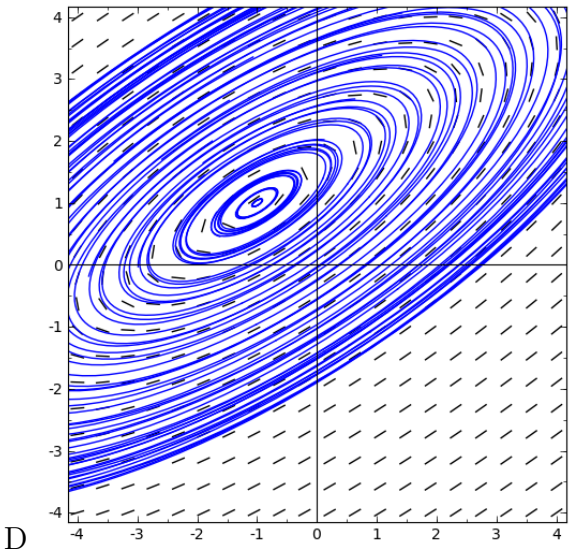
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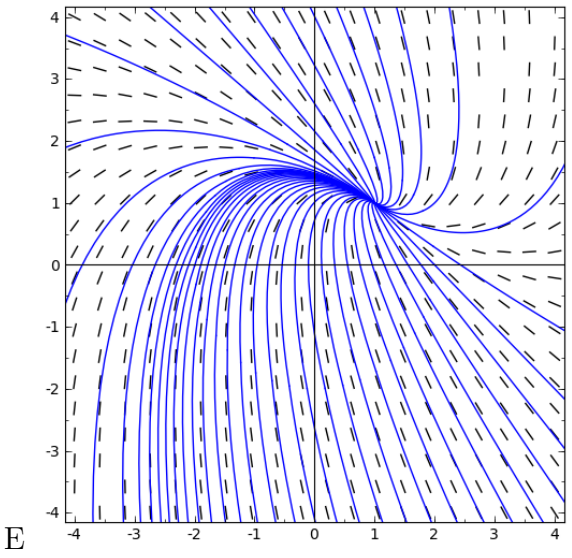
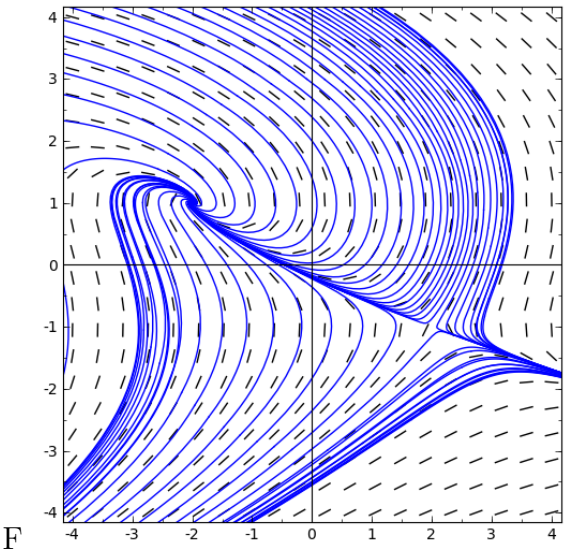

E


F