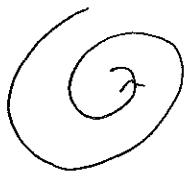
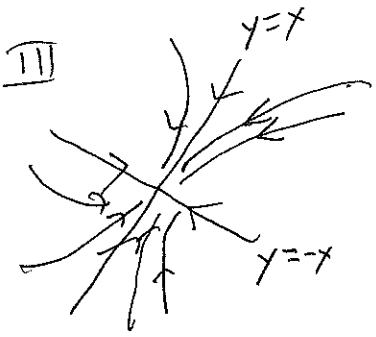
I

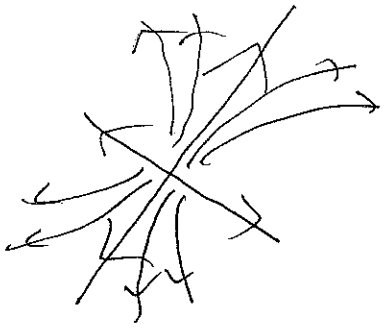


II

III



IV



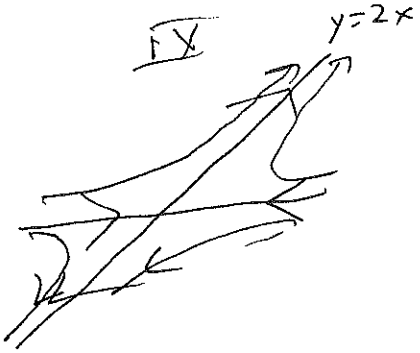
V

VI

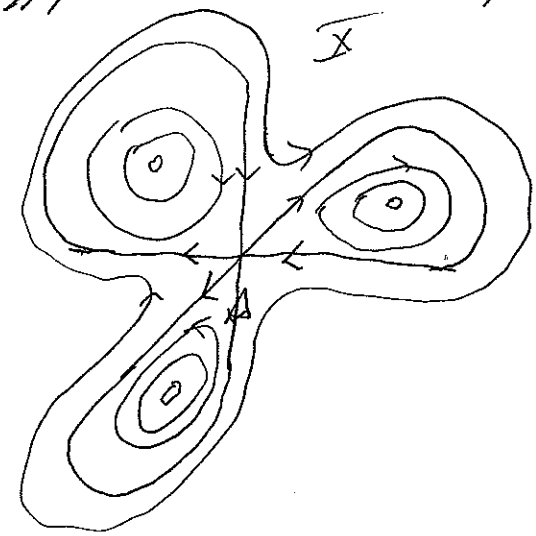
VII

VIII

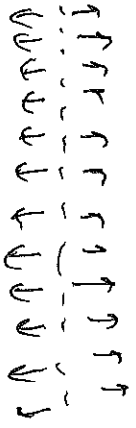
IX



X



XI



For each vector field here, $\vec{0}$ is a fixed point. Based on the picture (phase portrait) describe plausible

- formulae for the vector field.
- eigenvalues for its linearization at $\vec{0}$
- index about $\vec{0}$.

Example: VI : is a center.

plausible formula: $\dot{x} = -y$
$\dot{y} = \frac{1}{2}x$

plausible eigenvalues: $\pm i$; $w \pm iw$ w real $\neq 0$

Index: 1.

Note: $\dot{x} = y$
$\dot{y} = -\frac{1}{2}x$ No good: arrows wrong way.

$\dot{x} = -y$, $\dot{y} = x$: circles, no good. we have squashed.