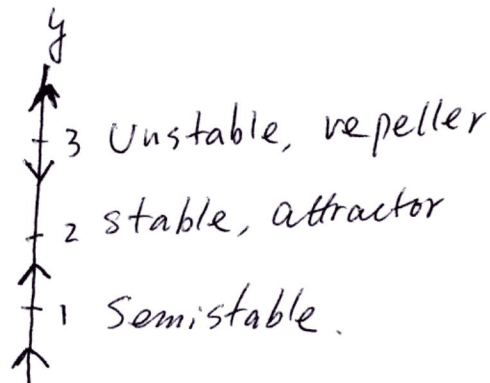


Hints for Review problems.

1. Separate the variables.
2. Multiply the Equation by x and then find the integrating factor $\mu(x) = e^{-2\int \frac{1}{x} dx} = e^{-2\ln x} = \frac{1}{x^2}$.
3. Follow the procedure of solving exact Equation.
4. Use the substitution: $u = \frac{y}{x}$, or $u = \frac{x}{y}$.
5. Use the substitution: $u = y^{-2}$.
6. Use undetermined coefficient or Variation of ~~of~~ parameter for non-homogeneous equations.
7. Use the substitution $x = e^t$.
8. Find a general Solution first, then determine the constants using B.C.
9. Find a general Solution first, then determine the constant using I.C.
10. Solve eigenvalue problem for homogeneous system and then use either undetermined coefficient or Variation of parameter to find the particular solution for the non-homogeneous system.

11. See textbook

12.



13. Omitted

$$14. \begin{vmatrix} \cos x & \sin x \\ -\sin x & \cos x \end{vmatrix} = 1 \Rightarrow \text{fundamental.}$$

15. Let

$$c_1 + c_2x + c_3x^2 + c_4x^3 = 0 \quad \text{for any } x$$

show $c_1 = c_2 = c_3 = c_4 = 0$.

Take $x = 0, 1, 2, 3$. Then

$$c_1 = 0$$

$$c_2 + c_3 + c_4 = 0$$

$$2c_2 + 4c_3 + 8c_4 = 0 \Rightarrow c_2 = c_3 = c_4 = 0$$

$$3c_3 + 9c_4 = 0$$