Differential Equations. Week 8

Remainder from the Week 7.
Construct the Green's function for a given boundary value problems.

1. (Filippov 764) $y'' = f(x)$, $y(0) = 0$, $y(1) = 0$.
2. (Filippov 767) $y'' - y = f(x)$, $y'(0) = 0$, $y'(2) + y(2) = 0$.
3. (Filippov 772) $y'' = f(x)$, $y(0) = 0$, $y|_{x\to\infty}$ is bounded.

Find eigenvalues and eigenfunctions.

4. (Filippov 782) $y'' = \lambda y$, $y(0) = 0$, $y(l) = 0$.
5. (Filippov 783) $y'' = \lambda y$, $y'(0) = 0$, $y'(l) = 0$.
6. (Filippov 784) $y'' = \lambda y$, $y(0) = 0$, $y'(l) = 0$.

Study singular points of the given equations and systems. Draw the trajectories.

1. (Filippov 961) $y' = \frac{2x+y}{3x+4y}$
2. (Filippov 963) $y' = \frac{y-2x}{y}$
3. (Filippov 967) $y' = \frac{y-2x}{2y-3x}$
4. (Filippov 971) $\begin{cases} \dot{x} = 3x \\ \dot{y} = 2x + y \end{cases}$
5. (Filippov 975) $\begin{cases} \dot{x} = -2x - 5y \\ \dot{y} = 2x + 2y \end{cases}$
6. (Filippov 977) $\begin{cases} \dot{x} = 3x - 2y \\ \dot{y} = 4y - 6x \end{cases}$