# Differential Equations. Week 10

Solve the systems of differential equations.

1. (Filippov 786) $\begin{cases} \dot{x} = 2x + y \\ \dot{y} = 3x + 4y \end{cases}$.

2. (Filippov 792) $\begin{cases} \dot{x} = 2x + y \\ \dot{y} = 4y - x \end{cases}$.

3. (Filippov 796) $\begin{cases} \dot{x} = x + z - y \\ \dot{y} = x + y - z \\ \dot{z} = 2x - y \end{cases}$   $(\lambda_1 = 1, \ \lambda_2 = 2, \ \lambda_3 = -1)$.

4. (Filippov 797) $\begin{cases} \dot{x} = x - 2y - z \\ \dot{y} = y - x + z \\ \dot{z} = x - z \end{cases}$   $(\lambda_1 = 0, \ \lambda_2 = 2, \ \lambda_3 = -1)$.

5. (Filippov 808) $\begin{cases} \dot{x} = x - y + z \\ \dot{y} = x + y - z \\ \dot{z} = 2z - y \end{cases}$   $(\lambda_1 = \lambda_2 = 1, \ \lambda_3 = 2)$.

6. (Filippov 811) $\begin{cases} \dot{x} = 2x - y - z \\ \dot{y} = 2x - y - 2z \\ \dot{z} = 2z - x + y \end{cases}$   $(\lambda_1 = \lambda_2 = \lambda_3 = 1)$.

Solve the systems of differential equations using the method of variation of parameters.

7. (Filippov 846) $\begin{cases} \dot{x} = y + \tan^2 t - 1 \\ \dot{y} = -x + \tan t \end{cases}$

8. (Filippov 849) $\begin{cases} \dot{x} = x - y + \frac{1}{\cos t} \\ \dot{y} = 2x - y \end{cases}$

**Homework:** Filippov 793, 804, 848.