Differential Equations. Week 6

Investigate if the following functions are linearly independent:

1. (Filippov 641) $x + 2$, $x - 2$.
2. (Filippov 660) x^2, $x|x|$.
3. (Filippov 649) x, e^x, xe^x.

Construct a homogeneous linear equation of minimal order which has the following certain solutions.

4. (Filippov 674) 1, $\cos x$.
5. (Filippov 676) $3x$, $x - 2$, $e^x + 1$.
6. (Filippov 678) e^x, $\sinh x$, $\cosh x$.

Find all solutions of given equations.

7. (Filippov 511) $y'' + y' - 2y = 0$
8. (Filippov 513) $y'' - 2y' = 0$
9. (Filippov 517) $y'' + 4y = 0$
10. (Filippov 519) $y^{(4)} - y = 0$

Find a solution of the differential equations using the method of variation of parameters.

11. (Filippov 575) $y'' - 2y' + y = \frac{e^x}{x}$
12. (Filippov 580) $y'' + y = \frac{2}{\cos^3 x}$
13. (Filippov 581) $x^3(y'' - y) = x^2 - 2$

Solve the initial value problem.

14. (Filippov 582) $y'' - 2y' + y = 0$, $y(2) = 1$, $y'(2) = -2$.
15. (Filippov 586) $y''' - y' = 0$, $y(0) = 3$, $y'(0) = -1$, $y''(0) = 1$.

Homework: Filippov 658, 679, 588.