

$$y'' + py' + qy = f(x)?$$

!!!

$f(x)$	\tilde{y}
1. $f(x) = 4$ ()	$\tilde{y} = A$
2. $f(x) = 3x - 1$	$\tilde{y} = Ax + B$
3. $f(x) = x^2 - x$	$\tilde{y} = Ax^2 + Bx + C$
4. $f(x) = 4x^3 + 3x^2 + 1$	$\tilde{y} = Ax^3 + Bx^2 + Cx + D$
<p> $\lambda^2 + \lambda - 2 = 0$ $y'' + y' - 2y = f(x)$ $y'' + y' - 2y = 0$ $\lambda^2 + \lambda - 2 = 0$ $\lambda_1 = -2, \lambda_2 = 1$ </p>	<p> $f(x)$ $f(x) = -5x$ $\tilde{y} = Ax + B$ </p>
5. $f(x) = 2e^{3x}$	<p> e^{3x} $\lambda_1 = -2 \quad \lambda_2 = 1$ $\tilde{y} = Ae^{3x}$ </p>
6. $f(x) = (2x - 3)e^{-x}$	<p> e^{-x} $\lambda_1 = -2 \quad \lambda_2 = 1$ $\tilde{y} = (Ax + B)e^{-x}$ </p>
7. $f(x) = \frac{x}{2}e^{-2x}$	<p> e^{-2x} $\lambda_1 = -2$ $\tilde{y} = (Ax + B)e^{-2x}$ $\tilde{y} = x(Ax + B)e^{-2x}$ $\tilde{y} = (Ax^2 + Bx)e^{-2x}$ </p>

8. $f(x) = e^x$	$\lambda_2 = 1$. $\tilde{y} = Ae^x$ $\tilde{y} = Axe^x$
$f(x) = (1-x^2)e^{-2x}$ $\tilde{y} = x(Ax^2 + Bx + C)e^{-2x} = (Ax^3 + Bx^2 + Cx)e^{-2x}$	$f(x) = 7x^2e^{5x}$ $\tilde{y} = (Ax^2 + Bx + C)e^{5x}$
9. $f(x) = \sin x$	$\tilde{y} = A \cos x + B \sin x$
10. $f(x) = -3 \cos 2x$	$\tilde{y} = A \cos 2x + B \sin 2x$
11. $f(x) = 2 \cos 3x - 4 \sin 3x$	$\tilde{y} = A \cos 3x + B \sin 3x$
12. $f(x) = -x \sin 5x$	$\tilde{y} = (Ax + B) \cos 5x + (Cx + D) \sin 5x$
13. $f(x) = (x-1) \cos \frac{x}{2}$	$\tilde{y} = (Ax + B) \cos \frac{x}{2} + (Cx + D) \sin \frac{x}{2}$
14. $f(x) = x \cos x + 2 \sin x$	$\tilde{y} = (Ax + B) \cos x + (Cx + D) \sin x$
15. $f(x) = 2e^x \sin 2x$	$\tilde{y} = e^x (A \cos 2x + \sin 2x)$
16. $f(x) = \frac{1}{3} e^{-3x} \sin x$	$\tilde{y} = e^{-3x} (A \cos x + \sin x)$
17. $f(x) = e^{-2x} (5 \sin 3x - \cos 3x)$	$\tilde{y} = e^{-2x} (A \cos 3x + \sin 3x)$
$\lambda_1 = -2, \lambda_2 = 1$	15-17 « »

<p>II.</p> <p>« ».</p> $y'' + 3y' = f(x).$ $y'' + 3y' = 0$ $\lambda^2 + 3\lambda = 0$ <p>: $\lambda_1 = -3, \lambda_2 = 0$</p>	
$f(x)$	\tilde{y}
<p>« »:</p>	
18. $f(x) = -10$	$\tilde{y} = x \cdot A, \quad \tilde{y} = Ax$
19. $f(x) = -2x$	$\tilde{y} = x \cdot (Ax + B), \quad \tilde{y} = Ax^2 + Bx$
20. $f(x) = x^2 + 3$	$\tilde{y} = x \cdot (Ax^2 + Bx + C) \quad \tilde{y} = (Ax^3 + Bx^2 + Cx)$
21. $f(x) = x^3$	$\tilde{y} = x \cdot (Ax^3 + Bx^2 + Cx + D) \quad \tilde{y} = (Ax^4 + Bx^3 + Cx^2 + Dx)$
<p>5-8.</p>	
22. $f(x) = (x^2 + 2x)e^{3x}$	$: e^{3x}$ $\lambda_1 = -3$ $\tilde{y} = (Ax^2 + Bx + C)e^{3x}$
23. $f(x) = (1 - x)e^{-3x}$	$: e^{-3x}$ $\lambda_1 = -3.$ $\tilde{y} = (Ax + B)e^{-3x}$ $\tilde{y} = x(Ax + B)e^{-3x},$ $\tilde{y} = (Ax^2 + Bx)e^{-3x}$
$f(x)$	9-17, (I).

« »:

$$y''' - y'' = f(x).$$

$$y''' - y'' = 0$$

$$\lambda^3 - \lambda^2 = 0$$

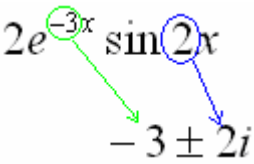
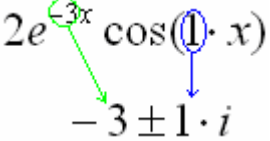
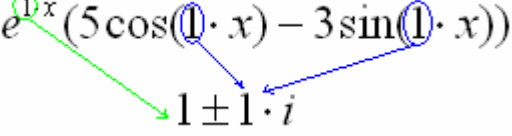
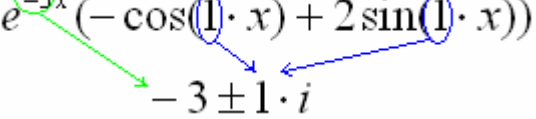
: $\lambda_{1,2} = 0, \lambda_3 = 1.$

(18-21), « » $x^2.$

, $f(x) = 3x,$:

$$\tilde{y} = x^2 \cdot (Ax + B) = (Ax^3 + Bx^2)$$

III. : $\lambda^2 - 4\lambda + 4 = 0$ ()		$y'' - 4y' + 4y = f(x).$ $y'' - 4y' + 4y = 0$: $\lambda_{1,2} = 2$
$f(x)$		\tilde{y}
$f(x) -$		« » 1-4
24. $f(x) = 5e^x$: e^{1x} $\lambda_{1,2} = 2$
25. $f(x) = -2e^{2x}$: e^{2x} $\lambda_{1,2} = 2.$
	$\tilde{y} = Ae^{2x}$	$x^2:$
	$\tilde{y} = x^2 \cdot Ae^{2x}$ $\tilde{y} = Ax^2e^{2x}$:
26. $f(x) = (5x - 1)e^{2x}$: e^{2x} $\lambda_{1,2} = 2.$
	« » $\tilde{y} = (Ax + B)e^{2x}$	$x^2:$
	$\tilde{y} = x^2 \cdot (Ax + B)e^{2x},$ $\tilde{y} = (Ax^3 + Bx^2)e^{2x}$:
$f(x)$		9-17,
- .	I.	

<p>IV.</p> <p>$\alpha \neq 0, \beta \neq 0$</p> <p>$\lambda^2 + 6\lambda + 10 = 0$</p>	<p style="text-align: right;">$\lambda_{1,2} = \alpha \pm \beta i,$</p> <p style="text-align: center;">$y'' + 6y' + 10y = f(x).$ $y'' + 6y' + 10y = 0$</p> <p style="text-align: center;">$\lambda_{1,2} = -3 \pm i$</p> <p style="text-align: right;">$\alpha.$</p>
<p style="text-align: center;">$f(x)$</p>	<p style="text-align: center;">?</p>
<p>(. 1-6, 9-14)</p>	
<p>27. $f(x) = 2e^{-3x} \sin 2x$</p>	<p style="text-align: center;">  </p> <p style="text-align: right;">$-3 \pm 2i$ —</p> <hr/> <p>$\lambda_{1,2} = -3 \pm i,$</p> <p style="text-align: center;">$\tilde{y} = e^{-3x}(A \cos 2x + \sin 2x)$</p>
<p>28. $f(x) = 2e^{-3x} \cos x$</p>	<p style="text-align: center;">  </p> <p style="text-align: right;">$-3 \pm i$</p> <p style="text-align: right;">$\lambda_{1,2} = -3 \pm i,$</p> <p>« »</p> <p>« »: $\tilde{y} = x \cdot e^{-3x}(A \cos x + B \sin x)$:</p> <p style="text-align: center;">$\tilde{y} = e^{-3x}(Ax \cos x + x \sin x)$</p>
<p>29. $f(x) = e^x(5 \cos x - 3 \sin x)$</p>	<p style="text-align: center;">  </p> <p style="text-align: right;">$1 \pm i$ —</p> <hr/> <p>$\lambda_{1,2} = -3 \pm i,$</p> <p style="text-align: center;">$\tilde{y} = e^x(A \cos x + \sin x)$</p>
<p>30. $f(x) = e^{-3x}(-\cos x + 2 \sin x)$</p>	<p style="text-align: center;">  </p> <p style="text-align: right;">$-3 \pm i$</p> <p style="text-align: center;">$\lambda_{1,2} = -3 \pm i,$:</p> <p style="text-align: center;">$\tilde{y} = x \cdot e^{-3x}(A \cos x + B \sin x) = e^{-3x}(Ax \cos x + x \sin x)$</p>

<p>V.</p> <p>$\lambda^2 + 4 = 0$</p> <p>$\lambda^2 + 4 = 0$</p> <p>$\lambda^2 + 4 = 0$</p>	
$f(x)$	\tilde{y}
	?
	« »
31. $f(x) = \sin x$	<p>$\sin(1 \cdot x)$</p> <p>$\pm 2i$</p> <p>$\tilde{y} = A \cos x + B \sin x$</p>
32. $f(x) = -3 \sin 2x$	<p>$-3 \sin 2x$</p> <p>$\pm 2i$</p> <p>« »: $\tilde{y} = x \cdot (A \cos 2x + B \sin 2x)$,</p> <p>$\tilde{y} = Ax \cos 2x + Bx \sin 2x$</p>
33. $f(x) = 2 \cos 3x - 2 \sin 3x$	<p>$2 \cos 3x - 2 \sin 3x$</p> <p>$\pm 2i$</p> <p>$\tilde{y} = A \cos 3x + B \sin 3x$</p>
34. $f(x) = 2x \cos 2x - \sin 2x$	<p>$2x \cos 2x - \sin 2x$</p> <p>$\pm 2i$</p> <p>« »: $\tilde{y} = x \cdot ((Ax + B) \cos 2x + (Cx + D) \sin 2x)$,</p> <p>$\tilde{y} = (Ax^2 + Bx) \cos 2x + (Cx^2 + Dx) \sin 2x$</p>
35. $f(x) = -3x \cos 4x$	<p>$-3x \cos 4x$</p> <p>$\pm 2i$</p> <p>« »: $\tilde{y} = (Ax + B) \cos 4x + (Cx + D) \sin 4x$</p>

5- :

<p>I.</p>	<p style="text-align: center;">$f(x)$ _____</p> <p>_____ (5-8)</p>
<p>II.</p>	<p style="text-align: center;">$f(x)$ _____, _____,</p> <p>_____</p> <p>(18-23)</p>
<p>III.</p>	<p style="text-align: center;">$f(x)$ _____</p> <p>_____ (24-26)</p>
<p>IV.</p> <p>$\lambda_{1,2} = \alpha \pm \beta i$, $\alpha \neq 0, \beta \neq 0$</p>	<p style="text-align: center;">27-30: $f(x) = 2e^{-3x} \sin 2x$, $f(x) = 2e^{-3x} \cos x$, $f(x) = e^x(5 \cos x - 3 \sin x)$. .</p>
<p>V.</p> <p>$\lambda_{1,2} = \pm \beta i$</p>	<p style="text-align: center;">_____ ; _____</p> <p>_____ () (31-35)</p>