

20191/2 2020

$$1. \quad \begin{matrix} 15 & 60 \\ \vec{y}' = \begin{pmatrix} -5 & -2 \\ 1 & -3 \end{pmatrix} \vec{y} & 4 \pm i \end{matrix}$$

$$2. \quad y'' + 2y' + 4y = e^{3x}(7x + 4)$$

$$3. \quad x^2 y'' - 2xy' + (x^2 + 2)y = 0 \quad x \cos x$$

$$4. \quad yy'' - 2(y')^2 = 0$$

$$10 \quad y_1 = \cos^2 x \quad y_2 = \sin^2 x \quad y_3 = |\cos 2x| \quad y_1, y_2, y_3$$

$$\left[0, \frac{\pi}{4}\right] \quad \left[\frac{\pi}{4}, \frac{\pi}{2}\right] \quad \left[0, \frac{\pi}{2}\right]$$

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$$\begin{cases} x' = -\sin(x+y) \\ y' = -\ln(1+y) \end{cases}$$

$$10 \quad p(x), q(x), r(x), f(x) \quad [0, 1]$$

$$y''' + p(x)y'' + q(x)y' + r(x)y = 0 \quad (I)$$

$$y''' + p(x)y'' + q(x)y' + r(x)y = f(x) \quad (II)$$

$$\Phi, \Psi \quad (I) \quad (II)$$

$$(I) \quad \phi(0) = \phi\left(\frac{1}{2}\right) = \phi(1) = 1$$

(II)

$$10 \quad p, q > 0 \quad \varphi$$

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

$$1 \quad f(x) \equiv 0 \quad \lim_{x \rightarrow +\infty} \varphi(x) = 0$$

$$2 \quad \lim_{x \rightarrow +\infty} f(x) = 0 \quad \lim_{x \rightarrow +\infty} \varphi(x) = 0$$

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