$$u^2\, \underline{\underline{y}} + u\, \underline{y} + y = u \Longrightarrow \underline{\underline{z}} + z = e^x$$

$$x^2\, \underline{\underline{y}} + x\, \underline{y} - y = 6\,x^5 + \frac{1}{x} / y\,(1) = \frac{1}{4} / \underline{y}\,(1) = 0\!: \quad y = c_1 x + \frac{c_2}{x} - \frac{\ln x}{2x} + \frac{x^5}{4}$$

$$x^2\, \underline{\underline{y}} - x\, \underline{y} + y = 2x / y\,(1) = 7 / \underline{y}\,(1) = 1\!: \quad y = 7x - 6x \ln x + x\,(\ln x)^2$$

$$x^2\, \underline{\underline{y}} - 2x\, \underline{y} + 2y = x \ln x / y\,(1) = 1 / \underline{y}\,(1) = 1\!: \quad \psi = -\frac{x}{2}\,(\ln x)^2 + x^2 - x \ln x$$

$$u^2\, \underline{\underline{y}} - 2u\, \underline{y} + 2y = 3\,u^2 + 2\,{}^{u}\!\not{\ell} \Longrightarrow \underline{\underline{z}} - 3\,z' + 2z = 3\,e^{2x} + 2x \Longrightarrow \begin{cases} \lambda_0 = 1 & {}^{x}\Phi_0 = e^x \\ \lambda_1 = 2 & {}^{x}\Phi_1 = e^{2x} \end{cases}$$

$$\Longrightarrow {}^{x}\varphi = C_0\, e^x + C_1\, e^{2x} \Longrightarrow {}^{x}\psi = Ax\, e^{2x} + Bx + C \Longrightarrow y = C_0 u + C_1\, u^2 + 3\,u^2\, {}^{u}\!\not{\ell} + {}^{u}\!\not{\ell} + \frac{3}{2}$$

$$u^2\, \underline{\underline{y}} + 5u\, \underline{y} + 4y = \frac{1}{u} \Longrightarrow \underline{\underline{z}} + 4\,z' + 4z = e^{-x} \Longrightarrow \begin{cases} \lambda_0 = -2 & {}^{x}\Phi_0 = e^{-2x} \\ \lambda_1 = -2 & {}^{x}\Phi_1 = xe^{-2x} \end{cases}$$

$$\Longrightarrow {}^{x}\varphi = C_0\, e^{-2x} + C_1\, x\, e^{-2x} \Longrightarrow {}^{x}\psi_0 = A\, e^{-x} \Longrightarrow y = \frac{C_0}{u^2} + C_1 \frac{{}^{u}\!\not{\ell}}{u^2} + \frac{1}{u}$$

$$u^2\, \underline{\underline{y}} + u\, \underline{y} - y = 6\,u^5 + \frac{1}{u} \Longrightarrow \underline{\underline{z}} - z = e^{-x} + 6\,e^{5x} \Longrightarrow \begin{cases} \lambda_0 = 1 & {}^{x}\Phi_0 = e^x \\ \lambda_1 = -1 & {}^{x}\Phi_1 = e^{-x} \end{cases}$$

$$\Longrightarrow {}^{x}\varphi = C_0\, e^x + C_1\, e^{-x} \Longrightarrow {}^{x}\psi_0 = x\left(-\frac{1}{2} e^{-x}\right) + \frac{1}{4}\, e^{5x} \Longrightarrow y = C_0 u + \frac{C_1}{u} - \frac{{}^{u}\!\not{\ell}}{2u} + \frac{u^5}{4}$$