RE21

DN.
60.

$$xy' + y = \ln x + 1 \quad , \quad x > 0$$

LINEARNA D.E

y_H : $y' + \frac{y}{x} = 0$

$$\frac{dy}{dx} + \frac{y}{x} = 0$$

$$\frac{dy}{y} = -\frac{dx}{x}$$

$$\ln|y| = -\ln|x| + \ln C \quad ; C > 0$$

$$|y| = \frac{C}{|x|}$$

$$y = \frac{D}{x} \quad ; \quad D \neq 0$$

KER JE $y = 0$ TUDI REŠITEV D.E.

PRIREJENE HOMOGENE ENAČBE, JE $y = \frac{E}{x}$, $E \in \mathbb{R}$

y_P : $y_P = \frac{E(x)}{x}$ (VARIACIJA KONSTANTE)

$$y_P' = \frac{E'(x)}{x} - \frac{E(x)}{x^2}$$

VSTAVIMO V OSNOVNO D.E.

$$x\left(\frac{E'(x)}{x} - \frac{E(x)}{x^2}\right) + \frac{E(x)}{x} = \ln x + 1$$

$$E'(x) - \frac{E(x)}{x} + \frac{E(x)}{x} = \ln x + 1$$

$$E'(x) = \ln x + 1 \Rightarrow$$

$$\Rightarrow E = \int \ln x \, dx + \int dx = x \ln x - \int dx + x = x \ln x \Rightarrow$$

$\ln x = u$ $dx = dv$

$\frac{1}{x} dx = du$ $v = x$

$$\Rightarrow y_s = y_P + y_H = \frac{x \ln x}{x} + \frac{E}{x} = \boxed{\ln x + \frac{E}{x} \quad , E \in \mathbb{R}}$$