

REŠI

$$xy' - y = \sqrt{x^2 + y^2}$$

PRIMER
HOMOGENO
DIFERENCIALNE
URAVNENJE

$$xy' - y = \sqrt{x^2 + y^2}$$

$$y' = \frac{y}{x} + \sqrt{1 + \left(\frac{y}{x}\right)^2}$$

(EVAČBA S HOMOGENO
DESNO STRANNO)

UVEDIMO NOVO SPRETELJIVKO $u = y/x$

$$u = \frac{y}{x} \Rightarrow y = ux \rightarrow y' = u'x + u$$

$$u'x + u = u + \sqrt{1 + u^2}$$

$$u'x = \sqrt{1 + u^2} \quad | : \sqrt{1 + u^2} \cdot (\sqrt{1 + u^2} > 0) \text{ ZA VSAK } u$$

$$\frac{du}{\sqrt{1 + u^2}} = \frac{dx}{x}$$

$$\int \frac{du}{\sqrt{1 + u^2}} = \ln|u + \sqrt{1 + u^2}| + C$$

(GLEJ TABELO OSNOVNIH INTEGRALOV)

$$\int \frac{du}{\sqrt{1 + u^2}} = \int \frac{dx}{x}$$

$$\ln|u + \sqrt{1 + u^2}| = \ln|x| + \ln C \quad C > 0$$

$$\ln|u + \sqrt{1 + u^2}| = C|x|$$

$$u + \sqrt{1 + u^2} = Dx \quad D \in \mathbb{R} \setminus \{0\}$$

$$\frac{y}{x} + \sqrt{1 + \left(\frac{y}{x}\right)^2} = Dx$$

$$\underline{\underline{y + \sqrt{x^2 + y^2} = Dx^2, D \neq 0}}$$

DVO NE PRIDE V POSTEV,
SAS $y + \sqrt{x^2 + y^2} = 0$

dx