

JEDNAČINE MATEMATIČKE FIZIKE - decembar 2001

1. Odrediti tip jednačine i svesti je na kanonski oblik

$$u_{xx} + xyu_{yy} - \frac{1}{2x}u_x + \frac{x}{2}u_y = 16x\sqrt{|y|}, \quad x \neq 0$$

2. Rešiti Košijev problem

$$\begin{cases} 4u_t &= u_{xx} \\ u(x, 0) &= e^{-x^2} \sin x \end{cases}$$

3. Rešiti mešoviti problem

$$\begin{cases} u_t &= u_{xx} + 6u + 2t(1 - 3t) - 6x + 2 \cos x \cos 2x, & 0 < x < \frac{\pi}{2}, t > 0 \\ u_x(0, t) &= 1 \\ u(\frac{\pi}{2}, t) &= t^2 + \frac{\pi}{2} \\ u(x, 0) &= x \end{cases}$$

JEDNAČINE MATEMATIČKE FIZIKE - januar 2002

1. Rešiti Košijev problem u I kvadrantu

$$\begin{cases} x^2 u_{xx} - y^2 u_{yy} - 2y u_y = 0 \\ u(1, y) = y \\ u_x(1, y) = y \end{cases}$$

2. Rešiti mešoviti problem

$$\begin{cases} u_{tt} = u_{xx} - 4u, & 0 < x < 1, \quad t > 0 \\ u(0, t) = 0 \\ u_x(1, t) = 0 \\ u(x, 0) = x(x - 1) \\ u_t(x, 0) = 0 \end{cases}$$

3. Rešiti mešoviti problem

$$\begin{cases} u_t = u_{xx} + u - \left(x - \frac{\pi}{2}\right)t^2 + t(1 - \pi + 2x) - 1 + 2 \sin 2x \sin x, & 0 < x < \frac{\pi}{2}, \quad t > 0 \\ u_x(0, t) = t^2 \\ u\left(\frac{\pi}{2}, t\right) = t \\ u(x, 0) = 2 \cos x \end{cases}$$