

# 某年冬学期偏微分方程王伟老师小测

一.(10 分) 用行波法求解定解问题:

$$\begin{cases} u_{xx} - u_{xy} - 2u_{yy} + u_x - 2u_y = 0, & x, y \in \mathbb{R}, \\ u(x, 0) = xe^{-x}, \\ u_y(x, 0) = 0. \end{cases}$$

二.(10 分) 用分离变量法求解定解问题:

$$\begin{cases} \frac{\partial^2 u}{\partial t^2} + 4 \frac{\partial u}{\partial t} = \frac{\partial^2 u}{\partial x^2}, & 0 < x < 1, t > 0 \\ u|_{x=0} = \frac{\partial u}{\partial x}\Big|_{x=1} = 0, \\ u|_{t=0} = x(x-1)^2, \quad \frac{\partial u}{\partial t}\Big|_{t=0} = 0. \end{cases}$$