

강좌번호 : 881.423.

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숙제 1. 4.1) 1, 3, 5, 6 due date : 3/19

숙제 2. 4.2) 2, 3, 4.3) 1, 2 (b),(c). In addition to 4.3) 2 (b), show that $u(\xi) \rightarrow f(x_1)$ as $\xi \rightarrow (x_1, 0)$. due date 3/26

숙제 3. 4.3) 3, 4, 7 due date : 4/9

숙제 4. due date : 4/16

(4-1) Let φ be a continuous function on \mathbb{R}^n with a compact support such that $\int_{\mathbb{R}^n} \varphi dx = 0$. Show that for any continuous integrable function f , $f * \varphi_\epsilon \rightarrow 0$ as $\epsilon \rightarrow 0$.

(4-2) Compute the Fourier transform of $\frac{1}{x^2+1}$ in one dimension.

숙제 5. 7.1) 1, 2, 4, 5 due date : 5/7

숙제 6. P213 7; P214 8; P45 3, 4; P132 1, due date : 6/3

(6-1) Find the solution of

$$\begin{cases} u_{tt} - u_{xx} = 0, & x > 0, t > 0, \\ u(0, t) = 0, & t > 0, \\ u(x, 0) = g(x), & x > 0, \\ u_t(x, 0) = f(x), & x > 0. \end{cases}$$

(Hint. Use the odd reflection over the t -axis and use d'Alembert formula.)

숙제 7. P18 1 (a), (b), (d); 2, due date : 기말고사일

(7-1) Find a shock wave solution for the following initial value problem:

$$u_t + u^2 u_x = 0, \quad -\infty < x < \infty, t > 0,$$

$$u(x, 0) = \begin{cases} 2 & \text{if } x \leq 0, \\ 1 & \text{if } x > 0. \end{cases}$$

(7-2) Find a rarefaction wave solution for the following initial value problem:

$$u_t + u^2 u_x = 0, \quad -\infty < x < \infty, t > 0,$$

$$u(x, 0) = \begin{cases} 1 & \text{if } x \leq 0, \\ 2 & \text{if } x > 0. \end{cases}$$