UM–SJTU Joint Institute

VV557 Methods of Applied Math II

Assignment 1

Group 22

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Exercise 1. 1

i).

For the intervals on

$$0 \leq x \leq \xi - \frac{1}{2n} \ \cup \ \xi + \frac{1}{2n} \leq x \leq 1$$

the equation is given as

$$-u'' = 0, \ \ u(0) = u(1) = 0$$

And this is the same as the case on lecture slide pp. 24, obviously the solution is given as

$$g(x, \xi) = \begin{cases} (1 - \xi) \cdot x & 0 \leq x \leq \xi - \frac{1}{2n} \\ \xi \cdot (1 - x) & \xi + \frac{1}{2n} \leq x \leq 1 \end{cases}$$

Next we need to discuss about the case about

$$f_n(x; \xi) = n \quad \text{for } \ \xi - \frac{1}{2n} \leq x \leq \xi + \frac{1}{2n}$$