

Amat 433 Fall 2002

Midterm Exam, Answers,

1 (a).  $b_n = \frac{2}{n} (-1)^{n+1}$

$$f(x) = 2 \sum_{n=1}^{\infty} \frac{(-1)^{n+1}}{n} \sin nx$$

1 (b) 1, -1, 0.

1 (c)  $\frac{2}{3} \pi^2$ .

2.  $U(x, t) = \frac{2}{\pi} \int_0^{\infty} \frac{\lambda}{1+\lambda^2} \sin \lambda x e^{-\lambda^2 t} d\lambda$ .

3.  $\omega = 1 \quad x_{(1)} = \begin{pmatrix} 1 \\ 1 \end{pmatrix} e^{it}$

$$\omega = \sqrt{5} \quad x_{(2)} = \begin{pmatrix} 1 \\ -1 \end{pmatrix} e^{i\sqrt{5}t}$$

4. E.g.  $A = \begin{pmatrix} 0 & 1 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 2 \end{pmatrix}$ .