



LUND
UNIVERSITY

Linear Analysis
Saturday January 23 2016
Duration: 08.00–13.00

Centre for Mathematical Sciences
Mathematics, Faculty of Science

Answers

- Divergent.
 - Convergent.
 - Convergent.
- The Fourier series is

$$\frac{2}{\pi} \sum_{n=-\infty}^{\infty} \frac{(-1)^n}{1-4n^2} e^{inx}.$$

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$$\sum_{k=1}^{\infty} \frac{(-1)^k}{4k^2-1} = \frac{1}{2} - \frac{\pi}{4}.$$

- The solution is

$$u(x, t) = \frac{3}{8} - \frac{1}{2} e^{-12t} \cos 2x + \frac{1}{8} e^{-48t} \cos 4x.$$

- The solution is e^{-x} .
 - $R = \infty$.
- $f(x) = x$ for $|x| \leq 1$, $f(x) = 0$ for $|x| > 1$.
 - Uniform convergence on $[0, 1]$.
 - Not uniform convergence on \mathbb{R} .