淡江大學九十一學年度碩士班招生考試試題

系別：物理系　　科目：物 理 數 學

准帶項目請打「○」否則打「×」	
計算機	字典
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1. 若 $f(x)=\begin{cases}1 & for\ |x|\le\frac{a}{2},\ a>0\\ 0 & elsewhere\end{cases}$ (a) 求 f(x)的 Fourier Transform F(u),

$F(u)\equiv\int_{-\infty}^{\infty}f(x)\exp(-2\pi iux)dx$ (b)Sketch $I(u)=|F(u)|^2$ versus frequency u (20 分)

2.利用 Residue theory 計算 $\int_{-\infty}^{\infty}\frac{\cos(3x)}{16+x^2}dx$ (10 分)

3.計算 $\int_{-\infty}^{\infty}\exp(-z^2)dz$ (10 分)

4.Find the eigenvalues and eigenvectors of the matrix

$$\begin{pmatrix}1 & 1 & 1\\ 1 & -1 & 1\\ 1 & 1 & -1\end{pmatrix}$$ (15 分)

5. If $\vec{F}=x\hat{i}+y\hat{j}$ Calculate the surface integral

$\int\vec{F}\bullet(\hat{n}\,dA)$ *over the part of the surface* $z=4-x^2-y^2$ *that is above the* (X,Y) *plane.*,

(15 分)

6.Given

$\vec{V}=4y\hat{i}+x\hat{j}+2z\hat{k}$, *find* $\int(\nabla\times\vec{V})\bullet(\hat{n}dA)$ *over the hemisphere* $x^2+y^2+z^2=16$, $z\ge0$

(15 分)

7.求 differential equation $(8P-T^2P)\frac{dP}{dT}+(T-TP^2)=0$ 的解 (15 分)