邊界元素法期中考 by J. T. Chen

考試時間— 12:00 to 13:20, June 5, 1997　　考試方式— Closed book

1. Fill in the following table.(15 %)

	欲解問題控制方程	輔助系統控制方程
conventional BEM	$\frac{d^2u(x)}{dx^2}=0$	
MRM	$\frac{d^2u(x)}{dx^2}+\lambda u(x)=0$	
Complex-valued BEM	$\frac{d^2u(x)}{dx^2}+\lambda u(x)=0$	

2. Explain the following items. (50%)
   (a). dual integral equations
   (b). dual boundary element method
   (c). Hadamard principal value
   (d). Cauchy principal value
   (e). kernel function
   (f). Green's function
   (g). degenerate boundary
   (h). fundamental solution
   (i). two-point function
   (j). multiple reciprocity method

3. In the course, we have $U(x,s)=ln(r)$ for 2-D Laplace equation, please extend to 3-D Laplace equation, such that

$$\nabla^2 U(x,s)=-4\pi\delta(x-s)$$

   where $U(x,s)=1/r$. Find the explicit forms for $T(s,x), L(s,x)$ and $M(s,x)$ (15%) and prove (15%)

$$U(s,x)=U(x,s)$$

$$T(s,x)=L(x,s)$$

$$M(s,x)=M(x,s)$$

4. What are the roles for hypersingularity in BEM ? (more than three roles) (10%)