
PS #1 , Fall 2006
Spatial Array Processing, ECE-539
Instructor: Balu Santhanam
Date Assigned: 08/24/2006
Date Due: 08/29/2006

1 Problem 1.1

Use the definitions of divergence, curl, and the Laplacian operator given in the class to prove the following null identities:

$$\begin{aligned}\vec{\nabla} \cdot (\vec{\nabla} \times \vec{A}) &= 0 \\ \vec{\nabla} \times \vec{\nabla} V &= \vec{0}.\end{aligned}$$

2 Problem 1.2

Show that the solutions to Maxwell's equations in free-space satisfy the wave-equation by making use of the identity:

$$\vec{\nabla} \times \vec{\nabla} \times \vec{A} = \nabla(\vec{\nabla} \cdot \vec{A}) - \nabla^2 \vec{A}.$$

3 Problem 1.3

Problem 2.7 from the text-book that deals with propagation of sound through a viscous fluid.