

COUPLED DERIVATIVE/MIXED FINITE ELEMENT APPROACH TO VISUAL RECONSTRUCTION

David Suter

1 INTRODUCTION

We are primarily concerned in this paper with the reconstruction of quantities from an image. We include in this class image reconstruction (where the reconstructed quantity is a restored or enhanced version of the image) or visual reconstruction (where the reconstructed quantity can be the distance to objects within the scene or some other "real world" quantity of interest).

It has become popular in these areas to seek a regularized solution since one can consider the problem as being an inverse problem. Typically, one may characterise the regularised problem as seeking a function Ψ that minimises some functional

$$(1) \quad E(\Psi) = D(\Psi; g) + S(\Psi)$$