

**Advances**  
**in**  
**Aircraft Structures**

**Editor**

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# Chapter 33

## Optimized Virtual Fields with Noise Minimization

Syed Muhammad Kashif

### Abstract

*This chapter discusses numerical issues in noise minimization and a representative cost function to be minimized. Such a minimization helps in finding a unique and optimized set of unknown bending rigidity that is least sensitive to noise. This chapter presents an optimized identification procedure with minimum noise sensitivity and its adaption for simultaneous identification of the unknown bending rigidities of a thin anisotropic plate.*

**Keywords:** *Noise minimization, optimized virtual fields, cost function, sensitivity to noisy data.*

### 1. Introduction

Finding an optimized virtual field means finding the vector of virtual dofs  $\{Y^*\}$  that fits to the criteria of kinematically admissible special virtual fields and at the same time minimizes  $\eta^\alpha$  (the effect of noisy data). This would lead to the most accurate identification of the unknown rigidities for a given number of virtual elements. Here the benefit of using greater number of virtual elements is worth noting. Larger is the space of K.A virtual fields, greater is the opportunity of finding a unique virtual field least sensitive to noise. For this problem of minimization it can be proved that the objective function is (Avril et al, 2004)