

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

**Editor**

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## Chapter 27

# The Constitutive Equation Gap Method

Syed Muhammad Kashif

### Abstract

*This chapter discusses constitutive equation gap method used for identification of materials constitutive parameters. It involves a comparison of given stress field and displacement field to a computed stress field generated by using an initial set of materials constitutive model. This method is based on the gap estimation and minimization that is measured as the distance between the two stress fields using a particular constitutive model. The method is found to be applicable and has shown promising results with the use of full field data used for material characterization.*

**Keywords:** *Inverse methods, constitutive model, gap minimization, material characterization.*

### 1. Introduction

The constitutive equation gap method (CEGM) is based on the constitutive equation gap which measures the distance between a given stress field  $\sigma$  and another stress field computed with a constitutive model and a given displacement field  $\vartheta$ . The constitutive equation for a material system is given by Eq.1, whereas a well posed boundary value problem as defined by Eq.2, is considered here.