



Developing Body Measurement Charts for Garment Manufacture Based on a Linear Programming Approach.

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ABSTRACT

The process of developing body size charts for a given population is a highly complex one as too many variables are involved. The requirements are often contradictory as in trying to provide the best fit using a minimum number of sizes. With the availability of advanced mathematical tools it is now possible to address the issue as an optimization problem. In the present study, an algorithm based on the Linear Programming approach has been developed specifically to cluster a given population data into homogenous body size groups. The theoretical efficiency of the approach has been demonstrated on an anthropometric database of 1900 young Indian women. The mathematical tool developed is flexible enough to be adapted for use for mass production as well as mass customization of garments. It is extremely versatile in that garment specific size tables can be developed. The degree of fit desired at each body dimension as well as the body dimensions used as the basis of clustering can be changed with ease. It is also a great tool for inventory management as it gives exactly the number of people covered by each cluster thus giving the manufacturer and retailer the choice of deciding how many pieces to make in each style and in what sizes.

Keywords: Body Measurements, CAD, Garment Fit, Garment Sizing, Linear Programming, Optimization.

Introduction

The process of developing body size charts for garment manufacturers is a very complex one. In this paper, the development and testing of a novel mathematical solution based on the LP approach has been proposed. The results have been extensively validated mathematically, using the anthropometric database of a group of young Indian men and women. However, wearer trials need to be conducted for converting these body measurements into garment

measurements. Further work is ongoing for developing a user friendly software based on the algorithm, for use by the garment manufacturing industry of India.

Background

A “size” is an item having specified measurements along certain dimensions, such that it will fit perfectly a person with measurements equal to that size (Tryfos, 1986). The purpose of an apparel sizing system is to divide a varied population into