

Examples of construction of carpet plots from experimental data

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EXAMPLES OF CONSTRUCTION OF CARPET PLOTS FROM EXPERIMENTAL DATA

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EXAMPLES OF CONSTRUCTION OF CARPET PLOTS FROM EXPERIMENTAL DATA

1. NOTATION

$C_1, C_2, C_3 \dots$	numerical coefficients
f_1, f_2	functional relationships
K_x, K_z, K_0	constants defining composite variable V
$P, P_1, P_2 \dots$	points on carpet or lattice
V	composite variable defined by $V = K_0 + K_x x + K_z z$
x, z	independent variables
y	dependent variable
$Z, Z_1, Z_2 \dots$	node points in carpet

2. INTRODUCTION

The principles of the “carpet” plot are described in Data Item No. 04008 (Reference 1). In the examples given there it is assumed that the “given” data for plotting are at convenient, usually equally-spaced, “round” values through which the carpet lines can be drawn directly. In practice, values of the independent variables, x and z , used in tests or experiments may not be evenly spaced, while the measured y -values are subject to the usual experimental errors. In consequence, construction of carpets from such data may be more complicated than indicated in Reference 1, depending on the nature of the data. Three distinct cases are identified here and considered in Sections 3, 4 and 5 as Examples “A”, “B” and “C”.

3. EXAMPLE A

One of the independent variables, say x , is held fixed at a series of equally spaced values that are convenient to use for the x -curves. Measurements are taken of y over a range of unequally-spaced values of z .

In Example A, x is fixed at values of 10, 20, 30 and 40 in turn, and measurements are taken of y while z is varied between 9 and 32 in unequal increments. It is required to construct a carpet plot from these data with curves for $x = 10, 20, 30$ and 40 and for $z = 10, 15, 20, 25$ and 30. To facilitate interpolation, the intersection points (nodes) of the required x - and z -curves should all lie on the graph ordinate lines spaced at 5, 10 or 20 divisions. Finally, the whole carpet is to be contained within 70 divisions of the abscissa.