

Spatial convolution of a stress field analyzed by X-ray diffraction

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Abstract: X-ray stress analysis suffers from homogeneity limitations of the stress field in the analyzed volume. When this homogeneity is not fulfilled, it is possible to reduce the irradiated volume down to stress homogeneity achievement. New limitation however occurs : the diffracting sites become too few for stress homogenization. We show that the diffractometry analysis corresponds to a spatially convoluted stress field. The inverse convolution problem is posed. An example of regularization method is given.

Keywords : XRD stress measurement, spatial convolution, stress gradient, inverse problem