1. Record Nr. UNISA996418195203316 Autore Malyarenko Anatoliy Titolo Random fields of piezoelectricity and piezomagnetism: correlation structures / / Anatoliy Malyarenko, Martin Ostoja-Starzewski, and Amirhossein Amiri-Hezaveh Pubbl/distr/stampa Cham, Switzerland:,: Springer,, [2020] ©2020 **ISBN** 3-030-60064-5 Edizione [1st ed. 2020.] Descrizione fisica 1 online resource (XI, 97 p. 2 illus., 1 illus. in color.) SpringerBriefs in Applied Sciences and Technology, Mathematical Collana methods Disciplina 530.141 Soggetti Electromagnetic theory Random fields Piezoelectricity Lingua di pubblicazione Inglese **Formato** Materiale a stampa Livello bibliografico Monografia Preface -- 1. Continuum Theory of Piezoelectricity and Piezomagnetism Nota di contenuto -- 2. Mathematical preliminaries -- 3. The Choice of a Basis in the Space VG -- 4. Correlation Structures -- References -- Index. Random fields are a necessity when formulating stochastic continuum Sommario/riassunto theories. In this book, a theory of random piezoelectric and piezomagnetic materials is developed. First, elements of the continuum mechanics of electromagnetic solids are presented. Then the relevant linear governing equations are introduced, written in terms of either a displacement approach or a stress approach, along with linear variational principles. On this basis, a statistical description of secondorder (statistically) homogeneous and isotropic rank-3 tensor-valued random fields is given. With a group-theoretic foundation, correlation functions and their spectral counterparts are obtained in terms of stochastic integrals with respect to certain random measures for the fields that belong to orthotropic, tetragonal, and cubic crystal systems. The target audience will primarily comprise researchers and graduate

students in theoretical mechanics, statistical physics, and probability.