Tensor Random Fields in Continuum Physics[1] MARTIN OSTOJA-STARZEWSKI, Univ of Illinois - Urbana-Champaign, ANATOLIY MALYARENKO, Mlardalen University — We discuss the basic properties of tensor random fields (TRFs) of statistically homogeneous kind, with focus on isotropic correlation functions with generally anisotropic realizations. We give explicit representations of TRFs of 2nd, 3rd, and 4th ranks [1-3]. We also find the corresponding spectral expansions. Next, we examine the consequences dictated by field equations on TRFs of displacement, stress and strain in classical continua and, similarly, for temperature and heat flux in conductivity. Then, we report analogous consequences for TRFs of rotation, curvature-torsion, and couple-stress in stochastic micropolar theories [4]. 1. A. Malyarenko and M. Ostoja-Starzewski, Statistically isotropic tensor random fields: Correlation structures, MEMOCS 2(2), 209-231, 2014. 2. A. Malyarenko and M. Ostoja-Starzewski, Spectral expansions of homogeneous and isotropic tensor-valued random fields, ZAMP 67(3), paper 59, 2016. 3. A. Malyarenko and M. Ostoja-Starzewski, A random field formulation of Hooke's law in all elasticity classes, arXiv:1602.09066 4. M. Ostoja-Starzewski, L. Shen and A. Malyarenko, Tensor random fields in conductivity and classical or microcontinuum theories, Math. Mech. Solids 20(4), 418-432, 2015.

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