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The paper deals with dense lattices where the number links exceed the number of degrees of freedom of the nodes. The lengths of the links in such lattices always satisfy additional compatibility conditions that are analogous to the compatibility conditions in continuum mechanics. We derive and analyze these conditions in a linear and nonlinear case and prove limiting theorems. The theory is applied to quantitative description of a state of a partially damaged lattice, providing a measure of the degree of a damage. (Received July 19, 2016)