

In this work, we study a complete family of non-expanding Lorentzian geometries with non-vanishing gyratonic terms in the Einstein–Gauss–Bonnet (EGB) theory of gravity of arbitrary dimension. First, we introduce the large Kundt class, defined geometrically by admitting a non-expanding, twist-free, shear-free null geodesic congruence, and summarise the main results from Einstein’s theory of gravity in an arbitrary dimension. We then systematically derive the field equations of EGB theory, analyse their main properties, and identify four distinct subclasses. Finally, we discuss the special case of fully general EGB pp -waves and EGB VSI/CSI spacetimes.