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On stable exponential cosmological type solutions with three factor spaces in Einstein-Gauss-Bonnet model with a Lambda-term

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We study a D-dimensional Einstein-Gauss-Bonnet model which includes the Gauss-Bonnet term, the cosmological term Λ and two non-zero constants: α_1 and α_2. Under imposing the metric to be diagonal one, we find cosmological type solutions with exponential dependence of three scale factors in a variable u, governed by three non-coinciding Hubble-like parameters: $H \neq 0$, h_1 and h_2, obeying $mH + k_1h_1 + k_2h_2 \neq 0$, corresponding to factor spaces of dimensions $m > 1$, $k_1 > 1$ and $k_2 > 1$, respectively, and depending upon sign parameter $\varepsilon = \pm 1$, where $\varepsilon = 1$ corresponds to cosmological case and $\varepsilon = -1$ - to static one). We deal with two cases: i) $m < k_1 < k_2$ and ii) $1 < k_1 = k_2 = k$, $k \neq m$. We show that in both cases the solutions exist if $\varepsilon\alpha = \varepsilon\alpha_2/\alpha_1 > 0$ and $\alpha\Lambda > 0$ satisfies certain (upper and lower) bounds. The solutions are defined up to solutions of certain polynomial master equation of order four (or less) which may be solved in radicals. In case ii) explicit solutions are presented. In both cases we single out stable and non-stable solutions as $u \to \pm\infty$. The case $H = 0$ is also considered.

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