A Variation on 3-GDD with Blocks of Size 4 and 3 Groups

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A variation, 3′-GDD$(n, 3, 4, \mu_1, \mu_2)$ as well as a 3-$(n, 3, 4, \lambda_1, \lambda_2, \lambda_3)$, on a 3-GDD is given. Some necessary conditions for the existence of these variationa are developed along with several constructions for infinite families and specific instances of nonexistence. In the process, we show that the neccessary conditions are sufficient for:

(i) $\mu_2 = 0$ and any μ_1, for all n. In particular, for μ_1 even, they exist for all n and for μ_1 odd, they exist for n even only.

(ii) n=3 or n=6, (n,3,4,6t,2) exists for t odd. and for t even, a (n,3,4,6t,2t) exists.