A generalization of Skiba's problem

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Abstract. Let H/K be any chief factor of a finite group G, p a prime, and j a nonnegative integer. We say that $G \in \mathfrak{S}_{p^j}^*$ if every chief factor H/K is a p-group or its p-part satisfies $|H/K|_p \leq p^j$. In this paper, we generalize Skiba's problem to the class $\mathfrak{S}_{p^j}^*$ of groups containing some non-solvable groups. We prove that $G \in \mathfrak{S}_{p^j}^*$ if and only if every maximal subgroup of a Sylow p-subgroup of G has a subnormal supplement in $\mathfrak{S}_{p^j}^*$, where $p > j$ or $p = j = 2$.

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