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Dimerizations in spin-S antiferromagnetic chains with three-spin interaction ZHENG-YUAN WANG, Tokyo Inst of Tech - Tokyo, SHUNSUKE C. FURUYA, University of Geneva - Geneva, MASAAKI NAKAMURA, Max Planck Institut for Solid State Reseach - Stuttgart, the University of Tokyo - Tokyo, RYO KOMAKURA, Tokyo Inst of Tech - Tokyo — We discuss spin-S antiferromagnetic Heisenberg chains with three-spin interactions, next-nearest interactions, and bond alternation. First, we prove rigorouslly that there exist parameter regions of the exact dimerized ground state in this system. This is a generalization of the Majumdar-Ghosh model to arbitral S. Next, we discuss the ground state phase diagram of the models by introducing several effective field theories and universality classes of the transitions are described by the level-$2S$ SU(2) Wess-Zumino-Witten model and the Gaussian model. Finally, we determine the phase diagrams of $S = 1$ and $S = 3/2$ systems by using exact diagonalization and level spectroscopy method.

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