Introducing Three Best Known Binary Goppa Codes

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The current best known $[239, 21]$, $[240, 21]$, and $[241, 21]$ binary linear codes have minimum distance 98, 98, and 99 respectively. In our research, we introduce three binary Goppa codes with Goppa polynomials $(x^{17} + 1)^6, (x^{16} + x)^6$, and $(x^{15} + 1)^6$. The Goppa codes are $[239, 21, 103]$, $[240, 21, 104]$, and $[241, 21, 104]$ binary linear codes respectively. These codes have greater minimum distance than the current best known codes with the respective length and dimension. In addition, with the techniques of puncturing, shortening, and extending, we find more derived codes with a better minimum distance than the current best known codes with the respective length and dimension.