

# 付 録 A      ガロア拡大体 $GF(2^8)$

## A.1    ガロア拡大体 $GF(2^8)$ のべき表現とベクトル表現

\*1 原始多項式 (既約多項式) は  $\alpha^8 + \alpha^4 + \alpha^3 + \alpha^2 + 1$  とする ( $\alpha^8 = \alpha^4 + \alpha^3 + \alpha^2 + 1$ )。

なお、 $\alpha^{2^8-1} \equiv \alpha^{255} \equiv \alpha^0 \equiv 1 \pmod{(\alpha^8 + \alpha^4 + \alpha^3 + \alpha^2 + 1)}$  より、 $\alpha^{255} = 1$ 。

\*2 多項式の係数は 2 を法とする ( $\text{mod } 2$ )。

| べき            | ベクトル表現                                               | 2 元符合    | べき            | ベクトル表現                                                          | 2 元符合    |
|---------------|------------------------------------------------------|----------|---------------|-----------------------------------------------------------------|----------|
| $\alpha^0$    | 1                                                    | 00000001 | $\alpha^{32}$ | $\alpha^7 + \alpha^4 + \alpha^3 + \alpha^2 + 1$                 | 10011101 |
| $\alpha^1$    | $\alpha$                                             | 00000010 | $\alpha^{33}$ | $\alpha^5 + \alpha^2 + \alpha + 1$                              | 00100111 |
| $\alpha^2$    | $\alpha^2$                                           | 00000100 | $\alpha^{34}$ | $\alpha^6 + \alpha^3 + \alpha^2 + \alpha$                       | 01001110 |
| $\alpha^3$    | $\alpha^3$                                           | 00001000 | $\alpha^{35}$ | $\alpha^7 + \alpha^4 + \alpha^3 + \alpha^2$                     | 10011100 |
| $\alpha^4$    | $\alpha^4$                                           | 00010000 | $\alpha^{36}$ | $\alpha^5 + \alpha^2 + 1$                                       | 00100101 |
| $\alpha^5$    | $\alpha^5$                                           | 00100000 | $\alpha^{37}$ | $\alpha^6 + \alpha^3 + \alpha$                                  | 01001010 |
| $\alpha^6$    | $\alpha^6$                                           | 01000000 | $\alpha^{38}$ | $\alpha^7 + \alpha^4 + \alpha^2$                                | 10010100 |
| $\alpha^7$    | $\alpha^7$                                           | 10000000 | $\alpha^{39}$ | $\alpha^5 + \alpha^4 + \alpha^2 + 1$                            | 00110101 |
| $\alpha^8$    | $\alpha^4 + \alpha^3 + \alpha^2 + 1$                 | 00011101 | $\alpha^{40}$ | $\alpha^6 + \alpha^5 + \alpha^3 + \alpha$                       | 01101010 |
| $\alpha^9$    | $\alpha^5 + \alpha^4 + \alpha^3 + \alpha$            | 00111010 | $\alpha^{41}$ | $\alpha^7 + \alpha^6 + \alpha^4 + \alpha^2$                     | 11010100 |
| $\alpha^{10}$ | $\alpha^6 + \alpha^5 + \alpha^4 + \alpha^2$          | 01110100 | $\alpha^{42}$ | $\alpha^7 + \alpha^5 + \alpha^4 + \alpha^2 + 1$                 | 10110101 |
| $\alpha^{11}$ | $\alpha^7 + \alpha^6 + \alpha^5 + \alpha^3$          | 11101000 | $\alpha^{43}$ | $\alpha^6 + \alpha^5 + \alpha^4 + \alpha^2 + \alpha + 1$        | 01110111 |
| $\alpha^{12}$ | $\alpha^7 + \alpha^6 + \alpha^3 + \alpha^2 + 1$      | 11001101 | $\alpha^{44}$ | $\alpha^7 + \alpha^6 + \alpha^5 + \alpha^3 + \alpha^2 + \alpha$ | 11101110 |
| $\alpha^{13}$ | $\alpha^7 + \alpha^4 + \alpha^2 + \alpha + 1$        | 10000111 | $\alpha^{45}$ | $\alpha^7 + \alpha^6 + 1$                                       | 11000001 |
| $\alpha^{14}$ | $\alpha^4 + \alpha + 1$                              | 00010011 | $\alpha^{46}$ | $\alpha^7 + \alpha^4 + \alpha^3 + \alpha^2 + \alpha + 1$        | 10011111 |
| $\alpha^{15}$ | $\alpha^5 + \alpha^2 + \alpha$                       | 00100110 | $\alpha^{47}$ | $\alpha^5 + \alpha + 1$                                         | 00100011 |
| $\alpha^{16}$ | $\alpha^6 + \alpha^3 + \alpha^2$                     | 01001100 | $\alpha^{48}$ | $\alpha^6 + \alpha^2 + \alpha$                                  | 01000110 |
| $\alpha^{17}$ | $\alpha^7 + \alpha^4 + \alpha^3 + \alpha^2 + 1$      | 10011000 | $\alpha^{49}$ | $\alpha^7 + \alpha^3 + \alpha^2$                                | 10001100 |
| $\alpha^{18}$ | $\alpha^5 + \alpha^3 + \alpha^2 + 1$                 | 00101101 | $\alpha^{50}$ | $\alpha^2 + 1$                                                  | 00000101 |
| $\alpha^{19}$ | $\alpha^6 + \alpha^4 + \alpha^3 + \alpha$            | 01011010 | $\alpha^{51}$ | $\alpha^3 + \alpha$                                             | 00001010 |
| $\alpha^{20}$ | $\alpha^7 + \alpha^5 + \alpha^4 + \alpha^2$          | 10110100 | $\alpha^{52}$ | $\alpha^4 + \alpha^2$                                           | 00010100 |
| $\alpha^{21}$ | $\alpha^6 + \alpha^5 + \alpha^4 + \alpha^2 + 1$      | 01110101 | $\alpha^{53}$ | $\alpha^5 + \alpha^3$                                           | 00101000 |
| $\alpha^{22}$ | $\alpha^7 + \alpha^6 + \alpha^5 + \alpha^3 + \alpha$ | 11101010 | $\alpha^{54}$ | $\alpha^6 + \alpha^4$                                           | 01010000 |
| $\alpha^{23}$ | $\alpha^7 + \alpha^6 + \alpha^3 + 1$                 | 11001001 | $\alpha^{55}$ | $\alpha^7 + \alpha^5$                                           | 10100000 |
| $\alpha^{24}$ | $\alpha^7 + \alpha^3 + \alpha^2 + \alpha + 1$        | 10001111 | $\alpha^{56}$ | $\alpha^6 + \alpha^4 + \alpha^3 + \alpha^2 + 1$                 | 01011101 |
| $\alpha^{25}$ | $\alpha + 1$                                         | 00000011 | $\alpha^{57}$ | $\alpha^7 + \alpha^5 + \alpha^4 + \alpha^3 + \alpha$            | 10111010 |
| $\alpha^{26}$ | $\alpha^2 + \alpha$                                  | 00000110 | $\alpha^{58}$ | $\alpha^6 + \alpha^5 + \alpha^3 + 1$                            | 01101001 |
| $\alpha^{27}$ | $\alpha^3 + \alpha^2$                                | 00001100 | $\alpha^{59}$ | $\alpha^7 + \alpha^6 + \alpha^4 + \alpha$                       | 11010010 |
| $\alpha^{28}$ | $\alpha^4 + \alpha^3$                                | 00011000 | $\alpha^{60}$ | $\alpha^7 + \alpha^5 + \alpha^4 + \alpha^3 + 1$                 | 10111001 |
| $\alpha^{29}$ | $\alpha^5 + \alpha^4$                                | 00110000 | $\alpha^{61}$ | $\alpha^6 + \alpha^5 + \alpha^3 + \alpha^2 + \alpha + 1$        | 01101111 |
| $\alpha^{30}$ | $\alpha^6 + \alpha^5$                                | 01100000 | $\alpha^{62}$ | $\alpha^7 + \alpha^6 + \alpha^4 + \alpha^3 + \alpha^2 + \alpha$ | 11011110 |
| $\alpha^{31}$ | $\alpha^7 + \alpha^6$                                | 11000000 | $\alpha^{63}$ | $\alpha^7 + \alpha^5 + 1$                                       | 10100001 |

| べき             | ベクトル表現                                                                     | 2 元符合    | べき             | ベクトル表現                                                     | 2 元符合    |
|----------------|----------------------------------------------------------------------------|----------|----------------|------------------------------------------------------------|----------|
| $\alpha^{64}$  | $\alpha^6 + \alpha^4 + \alpha^3 + \alpha^2 + \alpha + 1$                   | 01011111 | $\alpha^{112}$ | $\alpha^7 + 1$                                             | 10000001 |
| $\alpha^{65}$  | $\alpha^7 + \alpha^5 + \alpha^4 + \alpha^3 + \alpha^2 + \alpha$            | 10111110 | $\alpha^{113}$ | $\alpha^4 + \alpha^3 + \alpha^2 + \alpha + 1$              | 00011111 |
| $\alpha^{66}$  | $\alpha^6 + \alpha^5 + 1$                                                  | 01100001 | $\alpha^{114}$ | $\alpha^5 + \alpha^4 + \alpha^3 + \alpha^2 + \alpha$       | 00111110 |
| $\alpha^{67}$  | $\alpha^7 + \alpha^6 + \alpha$                                             | 11000010 | $\alpha^{115}$ | $\alpha^6 + \alpha^5 + \alpha^4 + \alpha^3 + \alpha^2$     | 01111100 |
| $\alpha^{68}$  | $\alpha^7 + \alpha^4 + \alpha^3 + 1$                                       | 10011001 | $\alpha^{116}$ | $\alpha^7 + \alpha^6 + \alpha^5 + \alpha^4 + \alpha^3$     | 11111000 |
| $\alpha^{69}$  | $\alpha^5 + \alpha^3 + \alpha^2 + \alpha + 1$                              | 00101111 | $\alpha^{117}$ | $\alpha^7 + \alpha^6 + \alpha^5 + \alpha^3 + \alpha^2 + 1$ | 11101101 |
| $\alpha^{70}$  | $\alpha^6 + \alpha^4 + \alpha^3 + \alpha^2 + \alpha$                       | 01011110 | $\alpha^{118}$ | $\alpha^7 + \alpha^6 + \alpha^5 + \alpha^2 + \alpha + 1$   | 11000111 |
| $\alpha^{71}$  | $\alpha^7 + \alpha^5 + \alpha^4 + \alpha^3 + \alpha^2$                     | 10111100 | $\alpha^{119}$ | $\alpha^7 + \alpha^4 + \alpha + 1$                         | 10010011 |
| $\alpha^{72}$  | $\alpha^6 + \alpha^5 + \alpha^2 + 1$                                       | 01100101 | $\alpha^{120}$ | $\alpha^5 + \alpha^4 + \alpha^3 + \alpha + 1$              | 00111011 |
| $\alpha^{73}$  | $\alpha^7 + \alpha^6 + \alpha^3 + \alpha$                                  | 11001010 | $\alpha^{121}$ | $\alpha^6 + \alpha^5 + \alpha^4 + \alpha^2 + \alpha$       | 01110110 |
| $\alpha^{74}$  | $\alpha^7 + \alpha^3 + 1$                                                  | 10001001 | $\alpha^{122}$ | $\alpha^7 + \alpha^6 + \alpha^5 + \alpha^3 + \alpha^2$     | 11101100 |
| $\alpha^{75}$  | $\alpha^3 + \alpha^2 + \alpha + 1$                                         | 00001111 | $\alpha^{123}$ | $\alpha^7 + \alpha^6 + \alpha^5 + \alpha^2 + 1$            | 11000101 |
| $\alpha^{76}$  | $\alpha^4 + \alpha^3 + \alpha^2 + \alpha$                                  | 00011110 | $\alpha^{124}$ | $\alpha^7 + \alpha^4 + \alpha^2 + \alpha + 1$              | 10010111 |
| $\alpha^{77}$  | $\alpha^5 + \alpha^4 + \alpha^3 + \alpha^2$                                | 00111100 | $\alpha^{125}$ | $\alpha^5 + \alpha^4 + \alpha + 1$                         | 00110011 |
| $\alpha^{78}$  | $\alpha^6 + \alpha^5 + \alpha^4 + \alpha^3$                                | 01111000 | $\alpha^{126}$ | $\alpha^6 + \alpha^5 + \alpha^2 + \alpha$                  | 01100110 |
| $\alpha^{79}$  | $\alpha^7 + \alpha^6 + \alpha^5 + \alpha^4$                                | 11110000 | $\alpha^{127}$ | $\alpha^7 + \alpha^6 + \alpha^3 + \alpha^2$                | 11001100 |
| $\alpha^{80}$  | $\alpha^7 + \alpha^6 + \alpha^5 + \alpha^4 + \alpha^3 + \alpha^2 + 1$      | 11111101 | $\alpha^{128}$ | $\alpha^7 + \alpha^2 + 1$                                  | 10000101 |
| $\alpha^{81}$  | $\alpha^7 + \alpha^6 + \alpha^5 + \alpha^2 + \alpha + 1$                   | 11100111 | $\alpha^{129}$ | $\alpha^4 + \alpha^2 + \alpha + 1$                         | 00010111 |
| $\alpha^{82}$  | $\alpha^7 + \alpha^6 + \alpha^4 + \alpha + 1$                              | 11010011 | $\alpha^{130}$ | $\alpha^5 + \alpha^3 + \alpha^2 + \alpha$                  | 00101110 |
| $\alpha^{83}$  | $\alpha^7 + \alpha^5 + \alpha^4 + \alpha^3 + \alpha + 1$                   | 10111011 | $\alpha^{131}$ | $\alpha^6 + \alpha^4 + \alpha^3 + \alpha^2$                | 01011100 |
| $\alpha^{84}$  | $\alpha^6 + \alpha^5 + \alpha^3 + \alpha + 1$                              | 01101011 | $\alpha^{132}$ | $\alpha^7 + \alpha^5 + \alpha^4 + \alpha^3$                | 10111000 |
| $\alpha^{85}$  | $\alpha^7 + \alpha^6 + \alpha^4 + \alpha^2 + \alpha$                       | 11010110 | $\alpha^{133}$ | $\alpha^6 + \alpha^5 + \alpha^3 + \alpha^2 + 1$            | 01101101 |
| $\alpha^{86}$  | $\alpha^7 + \alpha^5 + \alpha^4 + 1$                                       | 10110001 | $\alpha^{134}$ | $\alpha^7 + \alpha^6 + \alpha^4 + \alpha^3 + \alpha$       | 11011010 |
| $\alpha^{87}$  | $\alpha^6 + \alpha^5 + \alpha^4 + \alpha^3 + \alpha^2 + \alpha + 1$        | 01111111 | $\alpha^{135}$ | $\alpha^7 + \alpha^5 + \alpha^3 + 1$                       | 10101001 |
| $\alpha^{88}$  | $\alpha^7 + \alpha^6 + \alpha^5 + \alpha^4 + \alpha^3 + \alpha^2 + \alpha$ | 11111110 | $\alpha^{136}$ | $\alpha^6 + \alpha^3 + \alpha^2 + \alpha + 1$              | 01001111 |
| $\alpha^{89}$  | $\alpha^7 + \alpha^6 + \alpha^5 + 1$                                       | 11100001 | $\alpha^{137}$ | $\alpha^7 + \alpha^4 + \alpha^3 + \alpha^2 + \alpha$       | 10011110 |
| $\alpha^{90}$  | $\alpha^7 + \alpha^6 + \alpha^4 + \alpha^3 + \alpha^2 + \alpha + 1$        | 11011111 | $\alpha^{138}$ | $\alpha^5 + 1$                                             | 00100001 |
| $\alpha^{91}$  | $\alpha^7 + \alpha^5 + \alpha + 1$                                         | 10100011 | $\alpha^{139}$ | $\alpha^6 + \alpha + \alpha$                               | 01000010 |
| $\alpha^{92}$  | $\alpha^6 + \alpha^4 + \alpha^3 + \alpha + 1$                              | 01011011 | $\alpha^{140}$ | $\alpha^7 + \alpha^2 + \alpha$                             | 10000100 |
| $\alpha^{93}$  | $\alpha^7 + \alpha^5 + \alpha^4 + \alpha^2 + \alpha$                       | 10110110 | $\alpha^{141}$ | $\alpha^4 + \alpha^2 + 1$                                  | 00010101 |
| $\alpha^{94}$  | $\alpha^6 + \alpha^5 + \alpha^4 + 1$                                       | 01110001 | $\alpha^{142}$ | $\alpha^5 + \alpha^3 + \alpha$                             | 00101010 |
| $\alpha^{95}$  | $\alpha^7 + \alpha^6 + \alpha^5 + \alpha$                                  | 11100010 | $\alpha^{143}$ | $\alpha^6 + \alpha^4 + \alpha^2$                           | 01010100 |
| $\alpha^{96}$  | $\alpha^7 + \alpha^6 + \alpha^4 + \alpha^3 + 1$                            | 11011001 | $\alpha^{144}$ | $\alpha^7 + \alpha^5 + \alpha^3$                           | 10101000 |
| $\alpha^{97}$  | $\alpha^7 + \alpha^5 + \alpha^3 + \alpha^2 + \alpha + 1$                   | 10101111 | $\alpha^{145}$ | $\alpha^6 + \alpha^3 + \alpha^2 + 1$                       | 01001101 |
| $\alpha^{98}$  | $\alpha^6 + \alpha + 1$                                                    | 01000011 | $\alpha^{146}$ | $\alpha^7 + \alpha^4 + \alpha^3 + \alpha$                  | 10011010 |
| $\alpha^{99}$  | $\alpha^7 + \alpha^2 + \alpha$                                             | 10000110 | $\alpha^{147}$ | $\alpha^5 + \alpha^3 + 1$                                  | 00101001 |
| $\alpha^{100}$ | $\alpha^4 + 1$                                                             | 00010010 | $\alpha^{148}$ | $\alpha^6 + \alpha^4 + \alpha$                             | 01010010 |
| $\alpha^{101}$ | $\alpha^5 + \alpha$                                                        | 00100010 | $\alpha^{149}$ | $\alpha^7 + \alpha^5 + \alpha^2$                           | 10100100 |
| $\alpha^{102}$ | $\alpha^6 + \alpha^2$                                                      | 01000100 | $\alpha^{150}$ | $\alpha^6 + \alpha^4 + \alpha^2 + 1$                       | 01010101 |
| $\alpha^{103}$ | $\alpha^7 + \alpha^3$                                                      | 10001000 | $\alpha^{151}$ | $\alpha^7 + \alpha^5 + \alpha^3 + \alpha$                  | 10101010 |
| $\alpha^{104}$ | $\alpha^3 + \alpha^2 + 1$                                                  | 00001101 | $\alpha^{152}$ | $\alpha^6 + \alpha^3 + 1$                                  | 01001001 |
| $\alpha^{105}$ | $\alpha^4 + \alpha^3 + \alpha$                                             | 00011010 | $\alpha^{153}$ | $\alpha^7 + \alpha^4 + \alpha$                             | 10010010 |
| $\alpha^{106}$ | $\alpha^5 + \alpha^4 + \alpha^2$                                           | 00110100 | $\alpha^{154}$ | $\alpha^5 + \alpha^4 + \alpha^3 + 1$                       | 00111001 |
| $\alpha^{107}$ | $\alpha^6 + \alpha^5 + \alpha^3$                                           | 01101000 | $\alpha^{155}$ | $\alpha^6 + \alpha^5 + \alpha^4 + \alpha$                  | 01110010 |
| $\alpha^{108}$ | $\alpha^7 + \alpha^6 + \alpha^4$                                           | 11010000 | $\alpha^{156}$ | $\alpha^7 + \alpha^6 + \alpha^5 + \alpha^2$                | 11100100 |
| $\alpha^{109}$ | $\alpha^7 + \alpha^5 + \alpha^4 + \alpha^3 + \alpha^2 + 1$                 | 10111101 | $\alpha^{157}$ | $\alpha^7 + \alpha^6 + \alpha^4 + \alpha^2 + 1$            | 11010101 |
| $\alpha^{110}$ | $\alpha^6 + \alpha^5 + \alpha^2 + \alpha + 1$                              | 01100111 | $\alpha^{158}$ | $\alpha^7 + \alpha^5 + \alpha^4 + \alpha^2 + \alpha + 1$   | 10110111 |
| $\alpha^{111}$ | $\alpha^7 + \alpha^6 + \alpha^3 + \alpha^2 + \alpha$                       | 11001110 | $\alpha^{159}$ | $\alpha^6 + \alpha^5 + \alpha^4 + \alpha + 1$              | 01110011 |

| べき             | ベクトル表現                                                                         | 2 元符合    | べき             | ベクトル表現                                                              | 2 元符合    |
|----------------|--------------------------------------------------------------------------------|----------|----------------|---------------------------------------------------------------------|----------|
| $\alpha^{160}$ | $\alpha^7 + \alpha^6 + \alpha^5 + \alpha^2 + \alpha$                           | 11100110 | $\alpha^{208}$ | $\alpha^6 + \alpha^4 + 1$                                           | 01010001 |
| $\alpha^{161}$ | $\alpha^7 + \alpha^6 + \alpha^4 + 1$                                           | 11010001 | $\alpha^{209}$ | $\alpha^7 + \alpha^5 + \alpha + \alpha$                             | 10100010 |
| $\alpha^{162}$ | $\alpha^7 + \alpha^5 + \alpha^4 + \alpha^3 + \alpha^2 + \alpha + 1$            | 10111111 | $\alpha^{210}$ | $\alpha^6 + \alpha^4 + \alpha^3 + 1$                                | 01011001 |
| $\alpha^{163}$ | $\alpha^6 + \alpha^5 + \alpha + 1$                                             | 01100011 | $\alpha^{211}$ | $\alpha^7 + \alpha^5 + \alpha^4 + \alpha + \alpha$                  | 10110010 |
| $\alpha^{164}$ | $\alpha^7 + \alpha^6 + \alpha^2 + \alpha$                                      | 11000110 | $\alpha^{212}$ | $\alpha^6 + \alpha^5 + \alpha^4 + \alpha^3 + 1$                     | 01111001 |
| $\alpha^{165}$ | $\alpha^7 + \alpha^4 + 1$                                                      | 10010001 | $\alpha^{213}$ | $\alpha^7 + \alpha^6 + \alpha^5 + \alpha^4 + \alpha + \alpha$       | 11110010 |
| $\alpha^{166}$ | $\alpha^5 + \alpha^4 + \alpha^3 + \alpha^2 + \alpha + 1$                       | 00111111 | $\alpha^{214}$ | $\alpha^7 + \alpha^6 + \alpha^5 + \alpha^4 + \alpha^3 + 1$          | 11111001 |
| $\alpha^{167}$ | $\alpha^6 + \alpha^5 + \alpha^4 + \alpha^3 + \alpha^2 + \alpha$                | 01111110 | $\alpha^{215}$ | $\alpha^7 + \alpha^6 + \alpha^5 + \alpha^3 + \alpha^2 + \alpha + 1$ | 11101111 |
| $\alpha^{168}$ | $\alpha^7 + \alpha^6 + \alpha^5 + \alpha^4 + \alpha^3 + \alpha^2$              | 11111100 | $\alpha^{216}$ | $\alpha^7 + \alpha^6 + \alpha^4 + \alpha + 1$                       | 11000011 |
| $\alpha^{169}$ | $\alpha^7 + \alpha^6 + \alpha^5 + \alpha^2 + 1$                                | 11100101 | $\alpha^{217}$ | $\alpha^7 + \alpha^4 + \alpha^3 + \alpha + 1$                       | 10011011 |
| $\alpha^{170}$ | $\alpha^7 + \alpha^6 + \alpha^4 + \alpha^2 + \alpha + 1$                       | 11010111 | $\alpha^{218}$ | $\alpha^5 + \alpha^3 + \alpha + 1$                                  | 00101011 |
| $\alpha^{171}$ | $\alpha^7 + \alpha^5 + \alpha^4 + \alpha + 1$                                  | 10110011 | $\alpha^{219}$ | $\alpha^6 + \alpha^4 + \alpha^2 + \alpha$                           | 01010110 |
| $\alpha^{172}$ | $\alpha^6 + \alpha^5 + \alpha^4 + \alpha^3 + \alpha + 1$                       | 01111011 | $\alpha^{220}$ | $\alpha^7 + \alpha^5 + \alpha^3 + \alpha^2$                         | 10101100 |
| $\alpha^{173}$ | $\alpha^7 + \alpha^6 + \alpha^5 + \alpha^4 + \alpha^2 + \alpha$                | 11110110 | $\alpha^{221}$ | $\alpha^6 + \alpha^2 + 1$                                           | 01000101 |
| $\alpha^{174}$ | $\alpha^7 + \alpha^6 + \alpha^5 + \alpha^4 + 1$                                | 11110001 | $\alpha^{222}$ | $\alpha^7 + \alpha^3 + \alpha$                                      | 10001010 |
| $\alpha^{175}$ | $\alpha^7 + \alpha^6 + \alpha^5 + \alpha^4 + \alpha^3 + \alpha^2 + \alpha + 1$ | 11111111 | $\alpha^{223}$ | $\alpha^3 + 1$                                                      | 00001001 |
| $\alpha^{176}$ | $\alpha^7 + \alpha^6 + \alpha^5 + \alpha + 1$                                  | 11100011 | $\alpha^{224}$ | $\alpha^4 + \alpha$                                                 | 00010010 |
| $\alpha^{177}$ | $\alpha^7 + \alpha^6 + \alpha^4 + \alpha^3 + \alpha + 1$                       | 11011011 | $\alpha^{225}$ | $\alpha^5 + \alpha^2$                                               | 00100100 |
| $\alpha^{178}$ | $\alpha^7 + \alpha^5 + \alpha^3 + \alpha + 1$                                  | 10101011 | $\alpha^{226}$ | $\alpha^6 + \alpha^3$                                               | 01001000 |
| $\alpha^{179}$ | $\alpha^6 + \alpha^3 + \alpha + 1$                                             | 01001011 | $\alpha^{227}$ | $\alpha^7 + \alpha^4$                                               | 10010000 |
| $\alpha^{180}$ | $\alpha^7 + \alpha^4 + \alpha^2 + \alpha$                                      | 10010110 | $\alpha^{228}$ | $\alpha^5 + \alpha^4 + \alpha^3 + \alpha^2 + 1$                     | 00111101 |
| $\alpha^{181}$ | $\alpha^5 + \alpha^4 + 1$                                                      | 00110001 | $\alpha^{229}$ | $\alpha^6 + \alpha^5 + \alpha^4 + \alpha^3 + \alpha$                | 01111010 |
| $\alpha^{182}$ | $\alpha^6 + \alpha^5 + \alpha$                                                 | 01100010 | $\alpha^{230}$ | $\alpha^7 + \alpha^6 + \alpha^5 + \alpha^4 + \alpha^2$              | 11110100 |
| $\alpha^{183}$ | $\alpha^7 + \alpha^6 + \alpha^2$                                               | 11000100 | $\alpha^{231}$ | $\alpha^7 + \alpha^6 + \alpha^5 + \alpha^4 + \alpha^2 + 1$          | 11110101 |
| $\alpha^{184}$ | $\alpha^7 + \alpha^4 + \alpha^2 + 1$                                           | 10010101 | $\alpha^{232}$ | $\alpha^7 + \alpha^6 + \alpha^5 + \alpha^4 + \alpha^2 + \alpha + 1$ | 11110111 |
| $\alpha^{185}$ | $\alpha^5 + \alpha^4 + \alpha^2 + \alpha + 1$                                  | 00110111 | $\alpha^{233}$ | $\alpha^7 + \alpha^6 + \alpha^5 + \alpha^4 + \alpha + 1$            | 11110011 |
| $\alpha^{186}$ | $\alpha^6 + \alpha^5 + \alpha^3 + \alpha^2 + \alpha$                           | 01101110 | $\alpha^{234}$ | $\alpha^7 + \alpha^6 + \alpha^5 + \alpha^4 + \alpha^3 + \alpha + 1$ | 11111011 |
| $\alpha^{187}$ | $\alpha^7 + \alpha^6 + \alpha^4 + \alpha^3 + \alpha^2$                         | 11011100 | $\alpha^{235}$ | $\alpha^7 + \alpha^6 + \alpha^5 + \alpha^3 + \alpha + 1$            | 11101011 |
| $\alpha^{188}$ | $\alpha^7 + \alpha^5 + \alpha^2 + 1$                                           | 10100101 | $\alpha^{236}$ | $\alpha^7 + \alpha^6 + \alpha^3 + \alpha + 1$                       | 11001011 |
| $\alpha^{189}$ | $\alpha^6 + \alpha^4 + \alpha^2 + \alpha + 1$                                  | 01010111 | $\alpha^{237}$ | $\alpha^7 + \alpha^3 + \alpha + 1$                                  | 10001011 |
| $\alpha^{190}$ | $\alpha^7 + \alpha^5 + \alpha^3 + \alpha^2 + \alpha$                           | 10101110 | $\alpha^{238}$ | $\alpha^3 + \alpha + 1$                                             | 00001011 |
| $\alpha^{191}$ | $\alpha^6 + 1$                                                                 | 01000001 | $\alpha^{239}$ | $\alpha^4 + \alpha^2 + \alpha$                                      | 00010110 |
| $\alpha^{192}$ | $\alpha^7 + \alpha$                                                            | 10000010 | $\alpha^{240}$ | $\alpha^5 + \alpha^3 + \alpha^2$                                    | 00101100 |
| $\alpha^{193}$ | $\alpha^4 + \alpha^3 + 1$                                                      | 00011001 | $\alpha^{241}$ | $\alpha^6 + \alpha^4 + \alpha^3$                                    | 01011000 |
| $\alpha^{194}$ | $\alpha^5 + \alpha^4 + \alpha$                                                 | 00110010 | $\alpha^{242}$ | $\alpha^7 + \alpha^5 + \alpha^4$                                    | 10110000 |
| $\alpha^{195}$ | $\alpha^6 + \alpha^5 + \alpha^2$                                               | 01100100 | $\alpha^{243}$ | $\alpha^6 + \alpha^5 + \alpha^4 + \alpha^3 + \alpha^2 + 1$          | 01111101 |
| $\alpha^{196}$ | $\alpha^7 + \alpha^6 + \alpha^3$                                               | 11001000 | $\alpha^{244}$ | $\alpha^7 + \alpha^6 + \alpha^5 + \alpha^4 + \alpha^3 + \alpha$     | 11111010 |
| $\alpha^{197}$ | $\alpha^7 + \alpha^3 + \alpha^2 + 1$                                           | 10001101 | $\alpha^{245}$ | $\alpha^7 + \alpha^6 + \alpha^5 + \alpha^3 + 1$                     | 11101001 |
| $\alpha^{198}$ | $\alpha^2 + \alpha + 1$                                                        | 00000111 | $\alpha^{246}$ | $\alpha^7 + \alpha^6 + \alpha^3 + \alpha^2 + \alpha + 1$            | 11001111 |
| $\alpha^{199}$ | $\alpha^3 + \alpha^2 + \alpha$                                                 | 00001110 | $\alpha^{247}$ | $\alpha^7 + \alpha + \alpha + 1$                                    | 10000011 |
| $\alpha^{200}$ | $\alpha^4 + \alpha^3 + \alpha^2$                                               | 00011100 | $\alpha^{248}$ | $\alpha^4 + \alpha^3 + \alpha + 1$                                  | 00011011 |
| $\alpha^{201}$ | $\alpha^5 + \alpha^4 + \alpha^3$                                               | 00111000 | $\alpha^{249}$ | $\alpha^5 + \alpha^4 + \alpha^2 + \alpha$                           | 00110110 |
| $\alpha^{202}$ | $\alpha^6 + \alpha^5 + \alpha^4$                                               | 01110000 | $\alpha^{250}$ | $\alpha^6 + \alpha^5 + \alpha^3 + \alpha^2$                         | 01101100 |
| $\alpha^{203}$ | $\alpha^7 + \alpha^6 + \alpha^5$                                               | 11100000 | $\alpha^{251}$ | $\alpha^7 + \alpha^6 + \alpha^4 + \alpha^3$                         | 11011000 |
| $\alpha^{204}$ | $\alpha^7 + \alpha^6 + \alpha^4 + \alpha^3 + \alpha^2 + 1$                     | 11011101 | $\alpha^{252}$ | $\alpha^7 + \alpha^5 + \alpha^3 + \alpha^2 + 1$                     | 10101101 |
| $\alpha^{205}$ | $\alpha^7 + \alpha^5 + \alpha^2 + \alpha + 1$                                  | 10100111 | $\alpha^{253}$ | $\alpha^6 + \alpha^2 + \alpha + 1$                                  | 01000111 |
| $\alpha^{206}$ | $\alpha^6 + \alpha^4 + \alpha + 1$                                             | 01010011 | $\alpha^{254}$ | $\alpha^7 + \alpha^3 + \alpha^2 + \alpha$                           | 10001110 |
| $\alpha^{207}$ | $\alpha^7 + \alpha^5 + \alpha^2 + \alpha$                                      | 10100110 | 0              | 0                                                                   | 00000000 |

(メモ用紙)