

$Th \pmod{31}$

|       | blocks          | defect | matrix                                  |
|-------|-----------------|--------|---|
| $G :$ | 1               | 1      | $17 \times 15$                          |
|       | 2               | 0      | $248_1 = \chi_2, \varphi_2$             |
|       | 3               | 0      | $4123_1 = \chi_3, \varphi_3$            |
|       | 4               | 0      | $30628_1 = \chi_6, \varphi_6$           |
|       | 5               | 0      | $61256_1 = \chi_8, \varphi_8$           |
|       | 6               | 0      | $147250_1 = \chi_{11}, \varphi_{11}$    |
|       | 7               | 0      | $779247_1 = \chi_{14}, \varphi_{13}$    |
|       | $8 = \bar{7}$   | 0      | $779247_2 = \chi_{15}, \varphi_{14}$    |
|       | 9               | 0      | $957125_1 = \chi_{16}, \varphi_{15}$    |
|       | 10              | 0      | $2450240_1 = \chi_{19}, \varphi_{18}$   |
|       | 11              | 0      | $2572752_1 = \chi_{20}, \varphi_{19}$   |
|       | 12              | 0      | $3376737_1 = \chi_{21}, \varphi_{20}$   |
|       | 13              | 0      | $4123000_1 = \chi_{24}, \varphi_{23}$   |
|       | 14              | 0      | $4881384_1 = \chi_{25}, \varphi_{24}$   |
|       | 15              | 0      | $4936750_1 = \chi_{26}, \varphi_{25}$   |
|       | 16              | 0      | $6696000_1 = \chi_{29}, \varphi_{28}$   |
|       | $17 = \bar{16}$ | 0      | $6696000_2 = \chi_{30}, \varphi_{29}$   |
|       | 18              | 0      | $10822875_1 = \chi_{31}, \varphi_{30}$  |
|       | 19              | 0      | $11577384_1 = \chi_{32}, \varphi_{31}$  |
|       | 20              | 0      | $16539120_1 = \chi_{33}, \varphi_{32}$  |
|       | 21              | 0      | $21326760_1 = \chi_{35}, \varphi_{34}$  |
|       | $22 = \bar{21}$ | 0      | $21326760_2 = \chi_{36}, \varphi_{35}$  |
|       | 23              | 0      | $28861000_1 = \chi_{37}, \varphi_{36}$  |
|       | 24              | 0      | $40199250_1 = \chi_{39}, \varphi_{38}$  |
|       | 25              | 0      | $44330496_1 = \chi_{40}, \varphi_{39}$  |
|       | 26              | 0      | $51684750_1 = \chi_{41}, \varphi_{40}$  |
|       | 27              | 0      | $76271625_1 = \chi_{43}, \varphi_{41}$  |
|       | 28              | 0      | $77376000_1 = \chi_{44}, \varphi_{42}$  |
|       | 29              | 0      | $81153009_1 = \chi_{45}, \varphi_{43}$  |
|       | 30              | 0      | $91171899_1 = \chi_{46}, \varphi_{44}$  |
|       | 31              | 0      | $111321000_1 = \chi_{47}, \varphi_{45}$ |
|       | 32              | 0      | $190373976_1 = \chi_{48}, \varphi_{46}$ |

| <b>Block 1:</b>          | $\varphi_1$ | $\varphi_4$ | $\varphi_5$ | $\varphi_7$ | $\varphi_9$ | $\varphi_{10}$ | $\varphi_{12}$ | $\varphi_{16}$ | $\varphi_{17}$ | $\varphi_{21}$ | $\varphi_{22}$ | $\varphi_{26}$ | $\varphi_{27}$ |
|--------------------------|-------------|-------------|-------------|-------------|-------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| $1_1 = \chi_1$           | 1           | .           | .           | .           | .           | .              | .              | .              | .              | .              | .              | .              | .              |
| $27000_1 = \chi_4$       | .           | 1           | .           | .           | .           | .              | .              | .              | .              | .              | .              | .              | .              |
| $27000_2 = \chi_5$       | .           | .           | 1           | .           | .           | .              | .              | .              | .              | .              | .              | .              | .              |
| $30875_1 = \chi_7$       | 1           | .           | .           | 1           | .           | .              | .              | .              | .              | .              | .              | .              | .              |
| $85995_1 = \chi_9$       | .           | .           | .           | .           | 1           | .              | .              | .              | .              | .              | .              | .              | .              |
| $85995_2 = \chi_{10}$    | .           | .           | .           | .           | .           | 1              | .              | .              | .              | .              | .              | .              | .              |
| $767637_1 = \chi_{12}$   | .           | .           | .           | .           | .           | .              | 1              | .              | .              | .              | .              | .              | .              |
| $767637_2 = \chi_{13}$   | .           | .           | .           | .           | .           | .              | 1              | .              | .              | .              | .              | .              | .              |
| $1707264_1 = \chi_{17}$  | .           | .           | .           | .           | .           | .              | .              | 1              | .              | .              | .              | .              | .              |
| $1707264_2 = \chi_{18}$  | .           | .           | .           | .           | .           | .              | .              | .              | 1              | .              | .              | .              | .              |
| $4096000_1 = \chi_{22}$  | .           | .           | .           | .           | .           | .              | .              | .              | .              | 1              | .              | .              | .              |
| $4096000_2 = \chi_{23}$  | .           | .           | .           | .           | .           | .              | .              | .              | .              | .              | 1              | .              | .              |
| $6669000_1 = \chi_{27}$  | .           | .           | .           | .           | .           | .              | .              | .              | .              | .              | .              | 1              | .              |
| $6669000_2 = \chi_{28}$  | .           | .           | .           | .           | .           | .              | .              | .              | .              | .              | .              | .              | 1              |
| $18154500_1 = \chi_{34}$ | .           | 1           | 1           | .           | .           | .              | 1              | .              | .              | .              | .              | .              | .              |
| $30507008_1 = \chi_{38}$ | .           | .           | .           | 1           | .           | .              | .              | .              | .              | .              | .              | .              | .              |
| $72925515_1 = \chi_{42}$ | .           | .           | .           | .           | 1           | 1              | .              | 1              | 1              | 1              | 1              | 1              | 1              |

| <b>(Block 1:)</b>        | $\varphi_{33}$ | $\varphi_{37}$ |                  |              |
|--------------------------|----------------|----------------|------------------|--------------|
| $1_1 = \chi_1$           | .              | .              | $\varphi_1 =$    | $1_1$        |
| $27000_1 = \chi_4$       | .              | .              | $\varphi_4 =$    | $27000_1$    |
| $27000_2 = \chi_5$       | .              | .              | $\varphi_5 =$    | $27000_2$    |
| $30875_1 = \chi_7$       | .              | .              | $\varphi_7 =$    | $30874_1$    |
| $85995_1 = \chi_9$       | .              | .              | $\varphi_9 =$    | $85995_1$    |
| $85995_2 = \chi_{10}$    | .              | .              | $\varphi_{10} =$ | $85995_2$    |
| $767637_1 = \chi_{12}$   | .              | .              | $\varphi_{12} =$ | $767637_1$   |
| $767637_2 = \chi_{13}$   | .              | .              | $\varphi_{16} =$ | $1707264_1$  |
| $1707264_1 = \chi_{17}$  | .              | .              | $\varphi_{17} =$ | $1707264_2$  |
| $1707264_2 = \chi_{18}$  | .              | .              | $\varphi_{21} =$ | $4096000_1$  |
| $4096000_1 = \chi_{22}$  | .              | .              | $\varphi_{22} =$ | $4096000_2$  |
| $4096000_2 = \chi_{23}$  | .              | .              | $\varphi_{26} =$ | $6669000_1$  |
| $6669000_1 = \chi_{27}$  | .              | .              | $\varphi_{27} =$ | $6669000_2$  |
| $6669000_2 = \chi_{28}$  | .              | .              | $\varphi_{33} =$ | $17332863_1$ |
| $18154500_1 = \chi_{34}$ | 1              | .              | $\varphi_{37} =$ | $30476134_1$ |
| $30507008_1 = \chi_{38}$ | .              | 1              |                  |              |
| $72925515_1 = \chi_{42}$ | 1              | 1              |                  |              |