

$${}^2A_9(q) \bmod l, d = 2 \quad (l > 17)$$

|                 | <i>ps</i> | 11 | <i>ps</i> | 211 | 11 | 321 | 1111 | <i>ps</i> | 211 | <i>ps</i> | 2211 | 21111 | 11 | 321 | 11 |
|-----------------|-----------|----|-----------|-----|----|-----|------|-----------|-----|-----------|------|-------|----|-----|----|
| 5.              | 1         | .  | .         | .   | .  | .   | .    | .         | .   | .         | .    | .     | .  | .   | .  |
| 2.21            | 1         | 1  | .         | .   | .  | .   | .    | .         | .   | .         | .    | .     | .  | .   | .  |
| 2.111           | 1         | 1  | 1         | .   | .  | .   | .    | .         | .   | .         | .    | .     | .  | .   | .  |
| 2.3             | .         | .  | 1         | 1   | .  | .   | .    | .         | .   | .         | .    | .     | .  | .   | .  |
| 221.            | 1         | 1  | 1         | .   | 1  | .   | .    | .         | .   | .         | .    | .     | .  | .   | .  |
| 2111.           | .         | .  | .         | .   | .  | 1   | .    | .         | .   | .         | .    | .     | .  | .   | .  |
| .5              | .         | 1  | 1         | 3   | 1  | 2   | 1    | .         | .   | .         | .    | .     | .  | .   | .  |
| 21.2            | 1         | 1  | 1         | .   | 1  | .   | .    | 1         | .   | .         | .    | .     | .  | .   | .  |
| .221            | .         | .  | .         | .   | .  | .   | .    | 1         | 1   | .         | .    | .     | .  | .   | .  |
| 3.2             | .         | .  | 1         | 1   | 1  | 2   | .    | 1         | 1   | 1         | .    | .     | .  | .   | .  |
| 111.2           | .         | 1  | 1         | 3   | 1  | 2   | 1    | .         | .   | 1         | 1    | .     | .  | .   | .  |
| .2111           | .         | .  | .         | 1   | .  | 2   | .    | .         | 1   | 1         | 3    | 1     | .  | .   | .  |
| 4.1             | 1         | 1  | 1         | .   | 1  | .   | .    | 1         | .   | .         | .    | .     | 1  | .   | .  |
| 22.1            | .         | .  | .         | .   | .  | .   | .    | .         | .   | .         | .    | .     | .  | 1   | .  |
| 1111.1          | .         | .  | 1         | 1   | 1  | 2   | .    | .         | .   | 1         | .    | .     | .  | .   | 1  |
| 1.4             | .         | 1  | 1         | 3   | 2  | 4   | 1    | 1         | 3   | 1         | 1    | .     | 1  | 2   | 1  |
| 1.22            | .         | .  | .         | .   | 1  | 2   | .    | 1         | 3   | .         | .    | .     | 1  | 2   | .  |
| 1.1111          | .         | .  | .         | .   | .  | 1   | .    | .         | .   | .         | .    | .     | .  | 1   | .  |
| 41.             | .         | .  | .         | 3   | 1  | 8   | 1    | .         | 3   | 1         | 6    | 5     | .  | 2   | 1  |
| 11.3            | .         | .  | 1         | 1   | 1  | 2   | .    | 1         | 1   | 1         | .    | .     | 1  | 2   | 1  |
| 11.111          | .         | 1  | 1         | 3   | 2  | 4   | 1    | 1         | 3   | 1         | 1    | .     | 1  | 2   | 1  |
| 32.             | .         | .  | .         | .   | .  | .   | .    | 1         | 1   | .         | .    | .     | 1  | 2   | .  |
| 11.21           | .         | .  | .         | .   | .  | .   | .    | .         | .   | .         | .    | .     | .  | .   | .  |
| 11111.          | .         | .  | .         | .   | .  | .   | .    | .         | 1   | .         | .    | .     | .  | 2   | .  |
| .41             | .         | .  | .         | .   | 1  | 4   | .    | 1         | 4   | 1         | 1    | .     | 1  | 4   | 1  |
| .32             | .         | .  | .         | 1   | .  | 4   | .    | .         | 2   | 1         | 3    | 1     | .  | 4   | 1  |
| 111.11          | .         | .  | .         | 3   | 1  | 8   | 1    | .         | 3   | 1         | 7    | 5     | .  | 2   | 1  |
| 3.11            | .         | .  | .         | .   | .  | 2   | .    | .         | 1   | .         | 3    | 1     | .  | 2   | .  |
| 21.11           | .         | .  | .         | .   | 1  | 2   | .    | 1         | 3   | .         | .    | .     | 1  | 4   | 1  |
| .11111          | .         | .  | .         | .   | 1  | 4   | .    | 1         | 4   | 1         | 1    | .     | 1  | 6   | 2  |
| ${}^2A_5 : 2.$  | .         | .  | .         | 1   | .  | 4   | .    | .         | 1   | 1         | 3    | 1     | .  | 2   | 1  |
| 31.1            | .         | .  | .         | 3   | 1  | 10  | 1    | .         | 6   | 1         | 7    | 5     | 1  | 10  | 2  |
| 311.            | .         | .  | .         | .   | .  | 1   | .    | .         | .   | .         | .    | .     | .  | .   | .  |
| ${}^2A_5 : 11.$ | .         | .  | .         | .   | .  | 2   | .    | .         | 3   | .         | .    | .     | 1  | 8   | 1  |
| 1.31            | .         | .  | .         | .   | .  | .   | .    | .         | .   | .         | .    | .     | .  | 1   | .  |
| ${}^2A_5 : 1.1$ | .         | .  | .         | .   | .  | 6   | .    | .         | 3   | .         | 6    | 5     | .  | 8   | 1  |
| .311            | .         | .  | .         | .   | .  | 2   | .    | .         | 1   | .         | .    | .     | .  | 6   | 1  |
| ${}^2A_9$       | .         | .  | .         | .   | .  | 2   | .    | .         | 3   | .         | 1    | .     | 1  | 10  | 1  |
| 211.1           | .         | .  | .         | .   | .  | 2   | .    | .         | 1   | .         | 3    | 1     | .  | 4   | .  |
| 1.211           | .         | .  | .         | .   | .  | 6   | .    | .         | 3   | .         | 6    | 5     | .  | 8   | 1  |

|                 | 1111 | 3221 | 32111 | 111111 | $ps$ | 2211 | 211 |            | 4321 | 21111 | $ps$ | 22211 |
|-----------------|------|------|-------|--------|------|------|-----|------------|------|-------|------|-------|
| 5.              | .    | .    | .     | .      | .    | .    | .   |            | .    | .     | .    | .     |
| 2.21            | .    | .    | .     | .      | .    | .    | .   |            | .    | .     | .    | .     |
| 2.111           | .    | .    | .     | .      | .    | .    | .   |            | .    | .     | .    | .     |
| 2.3             | .    | .    | .     | .      | .    | .    | .   |            | .    | .     | .    | .     |
| 221.            | .    | .    | .     | .      | .    | .    | .   |            | .    | .     | .    | .     |
| 2111.           | .    | .    | .     | .      | .    | .    | .   |            | .    | .     | .    | .     |
| .5              | .    | .    | .     | .      | .    | .    | .   |            | .    | .     | .    | .     |
| 21.2            | .    | .    | .     | .      | .    | .    | .   |            | .    | .     | .    | .     |
| .221            | .    | .    | .     | .      | .    | .    | .   |            | .    | .     | .    | .     |
| 3.2             | .    | .    | .     | .      | .    | .    | .   |            | .    | .     | .    | .     |
| 111.2           | .    | .    | .     | .      | .    | .    | .   |            | .    | .     | .    | .     |
| .2111           | .    | .    | .     | .      | .    | .    | .   |            | .    | .     | .    | .     |
| 4.1             | .    | .    | .     | .      | .    | .    | .   |            | .    | .     | .    | .     |
| 22.1            | .    | .    | .     | .      | .    | .    | .   |            | .    | .     | .    | .     |
| 1111.1          | .    | .    | .     | .      | .    | .    | .   |            | .    | .     | .    | .     |
| 1.4             | 1    | .    | .     | .      | .    | .    | .   |            | .    | .     | .    | .     |
| 1.22            | 1    | 1    | .     | .      | .    | .    | .   |            | .    | .     | .    | .     |
| 1.1111          | .    | 2    | 1     | .      | .    | .    | .   |            | .    | .     | .    | .     |
| 41.             | 1    | 3    | 4     | 1      | .    | .    | .   |            | .    | .     | .    | .     |
| 11.3            | .    | .    | .     | .      | 1    | .    | .   |            | .    | .     | .    | .     |
| 11.111          | 1    | .    | .     | .      | 1    | 1    | .   |            | .    | .     | .    | .     |
| 32.             | .    | .    | .     | .      | 1    | .    | 1   |            | .    | .     | .    | .     |
| 11.21           | .    | .    | .     | .      | .    | .    | .   |            | 1    | .     | .    | .     |
| 11111.          | .    | .    | .     | .      | 1    | 3    | 1   |            | 2    | 1     | .    | .     |
| .41             | 1    | 3    | .     | .      | 1    | 1    | 1   |            | 2    | .     | 1    | .     |
| .32             | .    | 3    | 2     | .      | 1    | 3    | 1   |            | 2    | 1     | 1    | 1     |
| 111.11          | 1    | 3    | 4     | 1      | .    | 1    | .   |            | 2    | .     | 1    | 3     |
| 3.11            | .    | 3    | 2     | .      | .    | 3    | 1   |            | 6    | 1     | 1    | 6     |
| 21.11           | 1    | 1    | .     | .      | 1    | 1    | 3   |            | 2    | .     | .    | .     |
| .11111          | 1    | 3    | .     | .      | 1    | 1    | 3   |            | 2    | .     | 1    | .     |
| ${}^2A_5 : 2.$  | .    | 3    | 2     | .      | .    | .    | .   |            | 2    | .     | 1    | 1     |
| 31.1            | 2    | 6    | 8     | 1      | 1    | 7    | 3   |            | 8    | 5     | 1    | 3     |
| 311.            | .    | 2    | 1     | .      | .    | .    | .   | $a+3$      |      | .     | .    | .     |
| ${}^2A_5 : 11.$ | 1    | 4    | 4     | .      | 1    | 6    | 3   | $2a+6$     |      | 5     | .    | .     |
| 1.31            | .    | 2    | 1     | .      | .    | .    | .   | $3a+1$     |      | .     | .    | .     |
| ${}^2A_5 : 1.1$ | 1    | 11   | 14    | 1      | .    | 6    | 3   | $4a+14$    |      | 5     | 1    | 10    |
| .311            | .    | 6    | 2     | .      | 1    | 4    | 4   | $4a+10$    |      | 1     | 1    | 1     |
| ${}^2A_9$       | 1    | 6    | 4     | .      | 1    | 7    | 4   | $4a-b+10$  |      | 5     | 1    | 3     |
| 211.1           | .    | 6    | 4     | .      | .    | 3    | 1   | $4a-3b+10$ |      | 1     | 1    | 7     |
| 1.211           | 1    | 11   | 14    | 1      | .    | 7    | 3   | $4a-6b+20$ |      | 5     | 1    | 13    |

|                 | 221111 | 2111111 | 1111 | 11 | 33211 | 111111 | 32221 | 322111 | 3211111 |
|-----------------|--------|---------|------|----|-------|--------|-------|--------|---------|
| 5.              | .      | .       | .    | .  | .     | .      | .     | .      | .       |
| 2.21            | .      | .       | .    | .  | .     | .      | .     | .      | .       |
| 2.111           | .      | .       | .    | .  | .     | .      | .     | .      | .       |
| 2.3             | .      | .       | .    | .  | .     | .      | .     | .      | .       |
| 221.            | .      | .       | .    | .  | .     | .      | .     | .      | .       |
| 2111.           | .      | .       | .    | .  | .     | .      | .     | .      | .       |
| .5              | .      | .       | .    | .  | .     | .      | .     | .      | .       |
| 21.2            | .      | .       | .    | .  | .     | .      | .     | .      | .       |
| .221            | .      | .       | .    | .  | .     | .      | .     | .      | .       |
| 3.2             | .      | .       | .    | .  | .     | .      | .     | .      | .       |
| 111.2           | .      | .       | .    | .  | .     | .      | .     | .      | .       |
| .2111           | .      | .       | .    | .  | .     | .      | .     | .      | .       |
| 4.1             | .      | .       | .    | .  | .     | .      | .     | .      | .       |
| 22.1            | .      | .       | .    | .  | .     | .      | .     | .      | .       |
| 1111.1          | .      | .       | .    | .  | .     | .      | .     | .      | .       |
| 1.4             | .      | .       | .    | .  | .     | .      | .     | .      | .       |
| 1.22            | .      | .       | .    | .  | .     | .      | .     | .      | .       |
| 1.1111          | .      | .       | .    | .  | .     | .      | .     | .      | .       |
| 41.             | .      | .       | .    | .  | .     | .      | .     | .      | .       |
| 11.3            | .      | .       | .    | .  | .     | .      | .     | .      | .       |
| 11.111          | .      | .       | .    | .  | .     | .      | .     | .      | .       |
| 32.             | .      | .       | .    | .  | .     | .      | .     | .      | .       |
| 11.21           | .      | .       | .    | .  | .     | .      | .     | .      | .       |
| 11111.          | .      | .       | .    | .  | .     | .      | .     | .      | .       |
| .41             | .      | .       | .    | .  | .     | .      | .     | .      | .       |
| .32             | .      | .       | .    | .  | .     | .      | .     | .      | .       |
| 111.11          | 1      | .       | .    | .  | .     | .      | .     | .      | .       |
| 3.11            | 5      | 1       | .    | .  | .     | .      | .     | .      | .       |
| 21.11           | .      | .       | 1    | .  | .     | .      | .     | .      | .       |
| .11111          | .      | .       | 1    | 1  | .     | .      | .     | .      | .       |
| ${}^2A_5 : 2.$  | .      | .       | .    | 1  | 1     | .      | .     | .      | .       |
| 31.1            | 1      | .       | 1    | 1  | 3     | 1      | .     | .      | .       |
| 311.            | .      | .       | .    | .  | 2     | .      | 1     | .      | .       |
| ${}^2A_5 : 11.$ | .      | .       | 1    | .  | 3     | 1      | 2     | 1      | .       |
| 1.31            | .      | .       | .    | .  | 2     | .      | 3     | 4      | 1       |
| ${}^2A_5 : 1.1$ | 15     | 7       | 1    | 1  | 8     | 1      | 4     | 10     | 6       |
| .311            | .      | .       | 1    | 1  | 3     | .      | 4     | .      | .       |
| ${}^2A_9$       | 1      | .       | 1    | 1  | 3     | 1      | 4     | 3      | .       |
| 211.1           | 5      | 1       | .    | 1  | 4     | .      | 8     | 8      | 2       |
| 1.211           | 16     | 7       | 1    | 1  | 8     | 1      | 4     | 13     | 6       |

|                 | 11111111 | <i>ps</i> | 222211 | 2221111 | 22111111 | 211111111 | 1111111111 |
|-----------------|----------|-----------|--------|---------|----------|-----------|------------|
| 5.              | .        | .         | .      | .       | .        | .         | .          |
| 2.21            | .        | .         | .      | .       | .        | .         | .          |
| 2.111           | .        | .         | .      | .       | .        | .         | .          |
| 2.3             | .        | .         | .      | .       | .        | .         | .          |
| 221.            | .        | .         | .      | .       | .        | .         | .          |
| 2111.           | .        | .         | .      | .       | .        | .         | .          |
| .5              | .        | .         | .      | .       | .        | .         | .          |
| 21.2            | .        | .         | .      | .       | .        | .         | .          |
| .221            | .        | .         | .      | .       | .        | .         | .          |
| 3.2             | .        | .         | .      | .       | .        | .         | .          |
| 111.2           | .        | .         | .      | .       | .        | .         | .          |
| .2111           | .        | .         | .      | .       | .        | .         | .          |
| 4.1             | .        | .         | .      | .       | .        | .         | .          |
| 22.1            | .        | .         | .      | .       | .        | .         | .          |
| 1111.1          | .        | .         | .      | .       | .        | .         | .          |
| 1.4             | .        | .         | .      | .       | .        | .         | .          |
| 1.22            | .        | .         | .      | .       | .        | .         | .          |
| 1.1111          | .        | .         | .      | .       | .        | .         | .          |
| 41.             | .        | .         | .      | .       | .        | .         | .          |
| 11.3            | .        | .         | .      | .       | .        | .         | .          |
| 11.111          | .        | .         | .      | .       | .        | .         | .          |
| 32.             | .        | .         | .      | .       | .        | .         | .          |
| 11.21           | .        | .         | .      | .       | .        | .         | .          |
| 11111.          | .        | .         | .      | .       | .        | .         | .          |
| .41             | .        | .         | .      | .       | .        | .         | .          |
| .32             | .        | .         | .      | .       | .        | .         | .          |
| 111.11          | .        | .         | .      | .       | .        | .         | .          |
| 3.11            | .        | .         | .      | .       | .        | .         | .          |
| 21.11           | .        | .         | .      | .       | .        | .         | .          |
| .11111          | .        | .         | .      | .       | .        | .         | .          |
| ${}^2A_5 : 2.$  | .        | .         | .      | .       | .        | .         | .          |
| 31.1            | .        | .         | .      | .       | .        | .         | .          |
| 311.            | .        | .         | .      | .       | .        | .         | .          |
| ${}^2A_5 : 11.$ | .        | .         | .      | .       | .        | .         | .          |
| 1.31            | .        | .         | .      | .       | .        | .         | .          |
| ${}^2A_5 : 1.1$ | 1        | .         | .      | .       | .        | .         | .          |
| .311            | .        | 1         | .      | .       | .        | .         | .          |
| ${}^2A_9$       | .        | 1         | 1      | .       | .        | .         | .          |
| 211.1           | .        | 1         | 3      | 1       | .        | .         | .          |
| 1.211           | 1        | 1         | 6      | 5       | 1        | .         | .          |

|                 | $ps$ | 11 | $ps$ | 211 | 11 | 321 | 1111 | $ps$ | 211 | $ps$ | 2211 | 21111 | 11 | 321 | 11 |
|-----------------|------|----|------|-----|----|-----|------|------|-----|------|------|-------|----|-----|----|
| ${}^2A_5 : .2$  | .    | .  | .    | .   | .  | .   | .    | .    | .   | .    | .    | .     | .  | 2   | .  |
| ${}^2A_5 : .11$ | .    | .  | .    | .   | .  | .   | .    | .    | .   | .    | .    | .     | .  | 6   | .  |

|                 | 1111 | 3221 | 32111 | 111111 | $ps$ | 2211 | 211 |                  | 4321 | 21111 | $ps$ | 22211 |
|-----------------|------|------|-------|--------|------|------|-----|------------------|------|-------|------|-------|
| ${}^2A_5 : .2$  | .    | 3    | 2     | .      | .    | 3    | 1   | $4a - 10b + 14$  |      | 1     | .    | 6     |
| ${}^2A_5 : .11$ | .    | 8    | 10    | .      | .    | 6    | 3   | $10a - 15b + 26$ |      | 5     | .    | 10    |

|                 | 221111 | 2111111 | 1111 | 11 | 33211 | 111111 | 32221 | 322111 | 3211111 |
|-----------------|--------|---------|------|----|-------|--------|-------|--------|---------|
| ${}^2A_5 : .2$  | 5      | 1       | .    | .  | 3     | .      | 4     | 15     | 2       |
| ${}^2A_5 : .11$ | 15     | 7       | 1    | 1  | 15    | 1      | 10    | 45     | 14      |

|                 | 11111111 | $ps$ | 222211 | 2221111 | 22111111 | 211111111 | 1111111111 |
|-----------------|----------|------|--------|---------|----------|-----------|------------|
| ${}^2A_5 : .2$  | .        | 1    | 10     | 15      | 7        | 1         | .          |
| ${}^2A_5 : .11$ | 1        | 1    | 15     | 35      | 28       | 9         | 1          |

## References

- [DM15] O. Dudas and G. Malle. Decomposition matrices for low-rank unitary groups. *Proc. Lond. Math. Soc. (3)*, 110(6):1517–1557, 2015.