## All possible hubbard term of four state in Fock representation

```
term: (0, 0) mat elmt: (1, 1),
                                  1
term: (0, 0) mat elmt: (3, 3),
                                  1
      (0, 0) mat elmt: (5,
                             5),
                                  1
term:
                                  1
term: (0, 0) mat elmt: (7,
                             7),
term: (0, 0) mat elmt: (9,
                            9),
                                  1
term: (0, 0) mat elmt: (11,
                            11),
                                  1
term: (0, 0) mat elmt: (13, 13),
                                  1
term: (0, 0) mat elmt: (15, 15),
                                  1
term: (0, 1) mat_elmt: (3, 3),
                                  1
term: (0, 1) mat_elmt: (7, 7),
                                  1
term: (0, 1) mat elmt: (11, 11),
                                  1
term: (0, 1) mat elmt: (15, 15),
                                  1
term: (0, 2) mat_elmt: (5, 5),
                                  1
term: (0, 2) mat elmt: (7, 7),
                                  1
term: (0, 2) mat elmt: (13, 13),
                                  1
term: (0, 2) mat elmt: (15, 15),
                                  1
term: (0, 3) mat elmt: (9, 9),
                                  1
term: (0, 3) mat elmt: (11, 11),
                                  1
term: (0, 3) mat_elmt: (13, 13),
                                  1
term: (0, 3) mat elmt: (15, 15),
                                  1
term: (1, 0) mat_elmt: (3, 3),
                                  1
term: (1, 0) mat elmt: (7, 7),
                                  1
term: (1, 0) mat elmt: (11, 11),
                                  1
term: (1, 0) mat elmt:
                       (15, 15),
                                  1
term: (1, 1) mat_elmt: (2, 2),
                                  1
term: (1, 1) mat_elmt: (3, 3),
                                  1
```

```
term: (1, 1) mat elmt: (6, 6),
                                   1
                            7),
      (1, 1) mat elmt:
                       (7,
                                   1
term:
      (1, 1) mat elmt:
                       (10,
                             10).
                                   1
term:
                                   1
      (1, 1) mat elmt:
                       (11,
                             11),
term:
      (1, 1) mat elmt: (14,
                             14).
                                   1
term:
      (1,
         1) mat elmt:
                        (15.
                                   1
term:
      (1, 2) mat elmt: (6,
term:
                              6).
                                   1
      (1, 2) mat elmt: (7,
                                   1
                             7),
term:
term: (1, 2) mat_elmt: (14,
                             14),
                                   1
term: (1, 2) mat elmt:
                       (15,
                                   1
term: (1, 3) mat elmt: (10, 10),
                                   1
      (1, 3) mat_elmt: (11, 11),
                                   1
term:
term: (1, 3) mat_elmt: (14, 14),
                                   1
term: (1, 3) mat elmt:
                       (15,
                                   1
term: (2, 0) mat elmt: (5, 5),
                                   1
      (2, 0) mat elmt:
                       (7,
                              7).
                                   1
term:
term: (2, 0) mat_elmt:
                                   1
                       (13,
                            13),
term: (2, 0) mat elmt:
                        (15,
                                   1
term: (2, 1) mat_elmt: (6, 6),
                                   1
      (2, 1) mat elmt: (7, 1)
                            7),
                                   1
term:
      (2, 1) mat_elmt:
                       (14,
                             14).
                                   1
term:
                                   1
      (2, 1) mat elmt: (15,
term:
      (2, 2) mat_elmt: ( 4,
                              4),
term:
                                   1
      (2, 2) mat elmt: (5, 
                              5),
                                   1
term:
      (2, 2) mat elmt:
                       (6,
                                   1
term:
                              6),
      (2, 2) mat_elmt:
                       (7,
                                   1
                              7),
term:
      (2, 2) mat elmt:
                       (12,
                             12),
                                   1
term:
      (2, 2) mat_elmt:
                       (13,
                                   1
                            13),
term:
term: (2, 2) mat elmt:
                       (14, 14),
                                   1
```

```
term: (2, 2) mat elmt: (15, 15),
term: (2, 3) mat_elmt: (12, 12),
                                    1
                        (13,
      (2, 3) mat elmt:
                             13),
                                    1
term:
      (2, 3) mat_elmt:
term:
                        (14, 14),
                                    1
      (2, 3) mat elmt:
                        (15,
                             15).
                                    1
term:
term: (3, 0) mat elmt: (9,
                             9),
                                    1
term: (3, 0) mat elmt: (11,
                             11),
                                    1
term: (3, 0) mat elmt:
                        (13, 13),
                                    1
      (3, 0) mat_elmt:
                        (15,
                                    1
term:
term: (3, 1) mat elmt: (10, 10),
                                    1
      (3, 1) mat_elmt:
                        (11,
                             11),
                                    1
term:
term: (3, 1) mat elmt:
                        (14, 14),
                                    1
      (3, 1) mat elmt:
                        (15,
                              15).
                                    1
term:
      (3, 2) mat elmt: (12, 12),
term:
                                    1
      (3, 2) mat elmt:
                       (13, 13),
                                    1
term:
term: (3, 2) mat elmt:
                        (14, 14),
                                    1
             mat elmt:
      (3, 2)
                        (15,
                                    1
term:
                              15).
term: (3, 3) mat_elmt: (8,
                             8),
                                    1
                        (9,
      (3, 3) mat elmt:
                                    1
term:
                             9),
          3) mat_elmt:
                             10).
                                    1
      (3,
                        (10,
term:
      (3, 3)
             mat elmt:
                        (11,
term:
                              11),
                                    1
          3)
      (3,
             mat elmt:
                        (12,
                             12).
                                    1
term:
      (3, 3) mat elmt:
                        (13,
                             13),
                                    1
term:
term: (3, 3)
             mat elmt:
                        (14,
                                    1
                              14),
      (3, 3) mat elmt:
                        (15.
                                    1
term:
```