Correlator Matrix Visualization

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```
source('numeric_utils.R')

workdir <- '~/Lattice/Three-Pions/wdir_2pi_I2'
```

```
all_projected_paths <- Sys.glob(paste0(workdir, '/projected/resolved_*_*_*.js'))
all_jsons <- lapply(all_projected_paths, jsonlite::read_json, simplifyVector = TRUE)
```

```
irrep_nonempty <- sapply(all_jsons, function (x) length(unlist(x))) > 0
relevant_jsons <- all_jsons[irrep_nonempty]
```

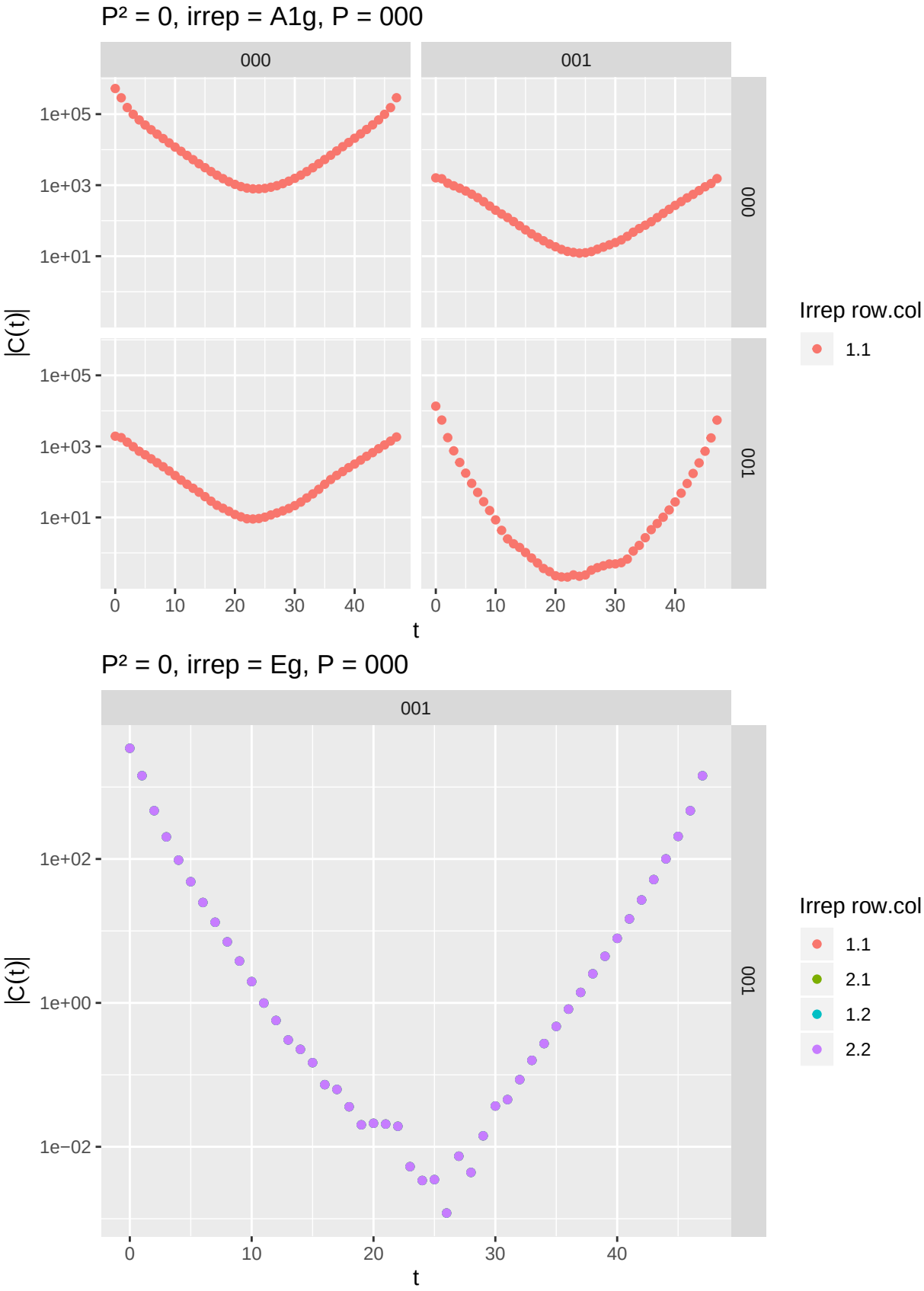
```
data <- do.call(c, relevant_jsons)
```

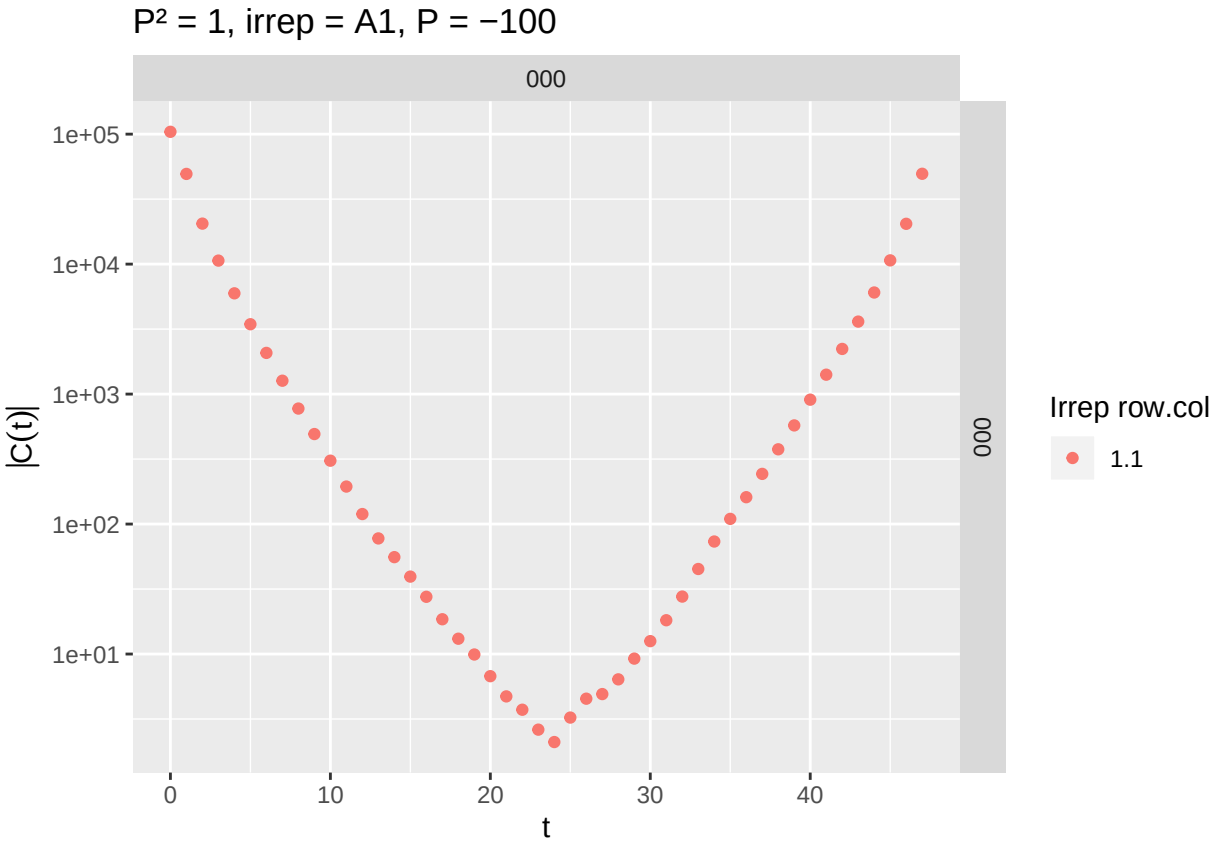
```
parts <- list()

for (total_momentum_idx in 1:length(data)) {
  total_momentum_str <- names(data)[[total_momentum_idx]]
  irreps <- data[[total_momentum_idx]]

  total_momentum_vec <- total_momentum_str_to_vec(total_momentum_str)
  total_momentum_sq <- sum(total_momentum_vec^2)

  for (irrep_idx in 1:length(irreps)) {
    irrep <- names(irreps)[[irrep_idx]]
    irrep_cols <- irreps[[irrep_idx]]
    if (length(irrep_cols) == 0) {
      next
    }

    for (irrep_col_idx in 1:length(irrep_cols)) {
      irrep_col_str <- names(irrep_cols)[[irrep_col_idx]]
      irrep_rows <- irrep_cols[[irrep_col_idx]]
      if (length(irrep_rows) == 0) {
        next
      }

      for (irrep_row_idx in 1:length(irrep_rows)) {
        irrep_row_str <- names(irrep_rows)[[irrep_row_idx]]
        corr_rows <- irrep_rows[[irrep_row_idx]]
        if (length(corr_rows) == 0) {
          next
        }

        for (corr_row_idx in 1:length(corr_rows)) {
          corr_row_str <- names(corr_rows)[[corr_row_idx]]
          corr_cols <- corr_rows[[corr_row_idx]]
          if (length(corr_cols) == 0) {
            next
          }
```

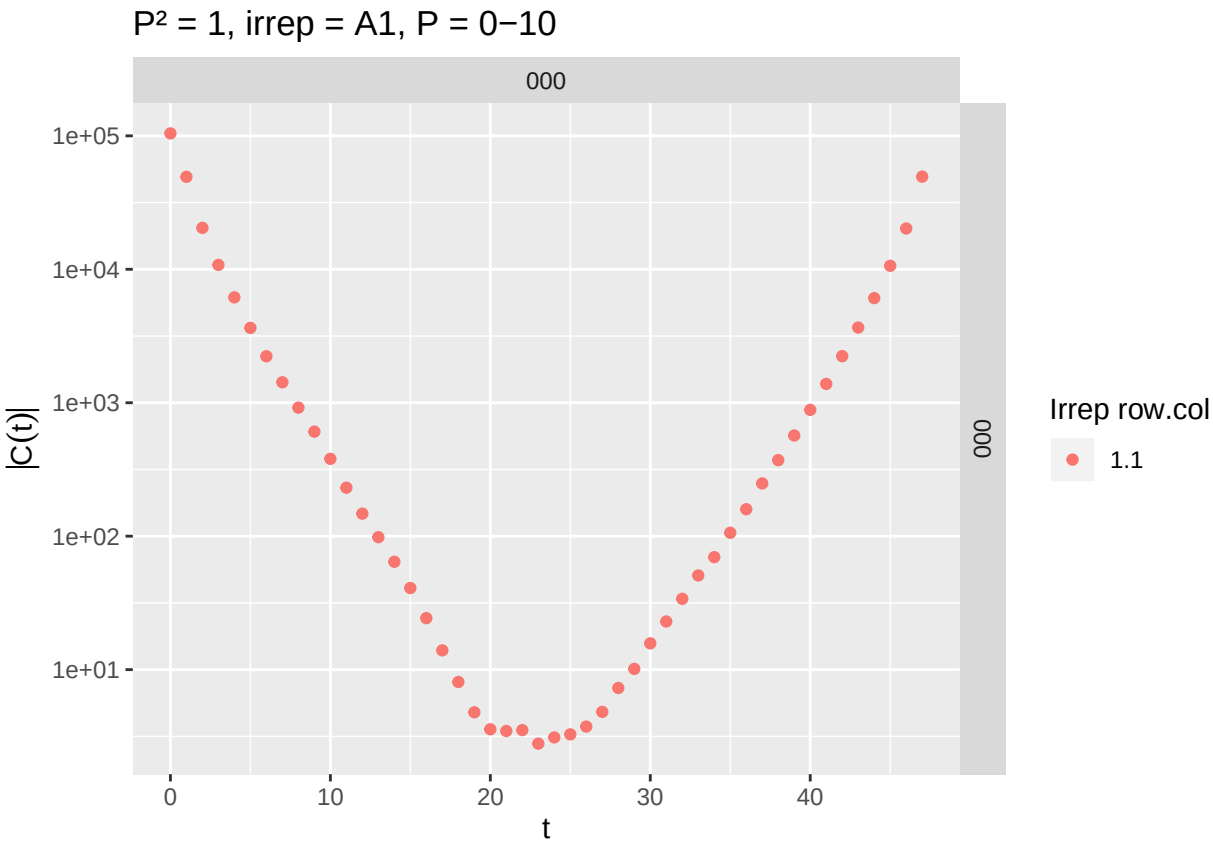
```
          for (corr_col_idx in 1:length(corr_cols)) {
            corr_col_str <- names(corr_cols)[[corr_col_idx]]
            corr <- corr_cols[[corr_col_idx]]

            part <- tibble(
              total_momentum_sq = total_momentum_sq,
              total_momentum_str = total_momentum_str,
              irrep = irrep,
              irrep_row = as.integer(irrep_row_str),
              irrep_col = as.integer(irrep_col_str),
              corr_row = corr_row_str,
              corr_col = corr_col_str,
              time = 0:(length(corr)-1),
              corr = corr)

            parts <- c(parts, list(part))
          }
        }
      }

    }
  }
}
```

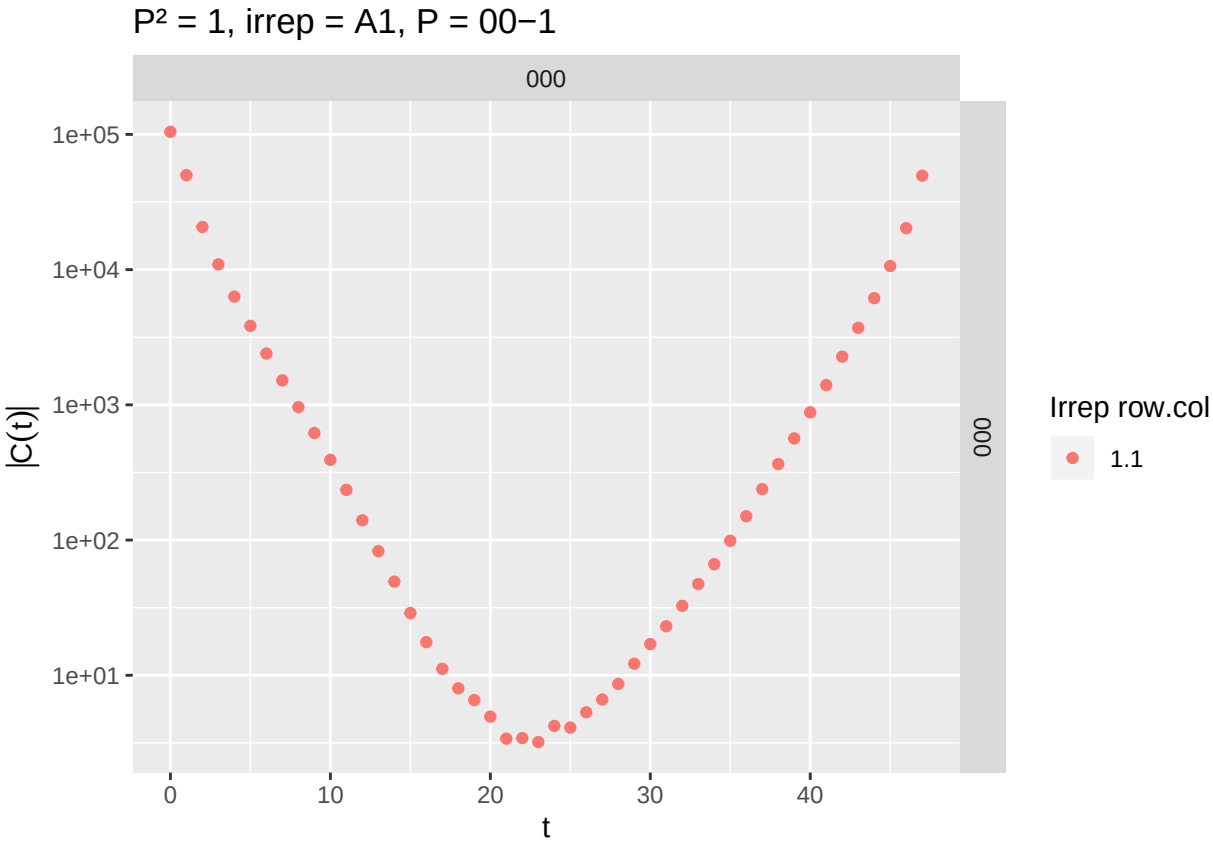
```
parts_long <- do.call(rbind, parts)
```

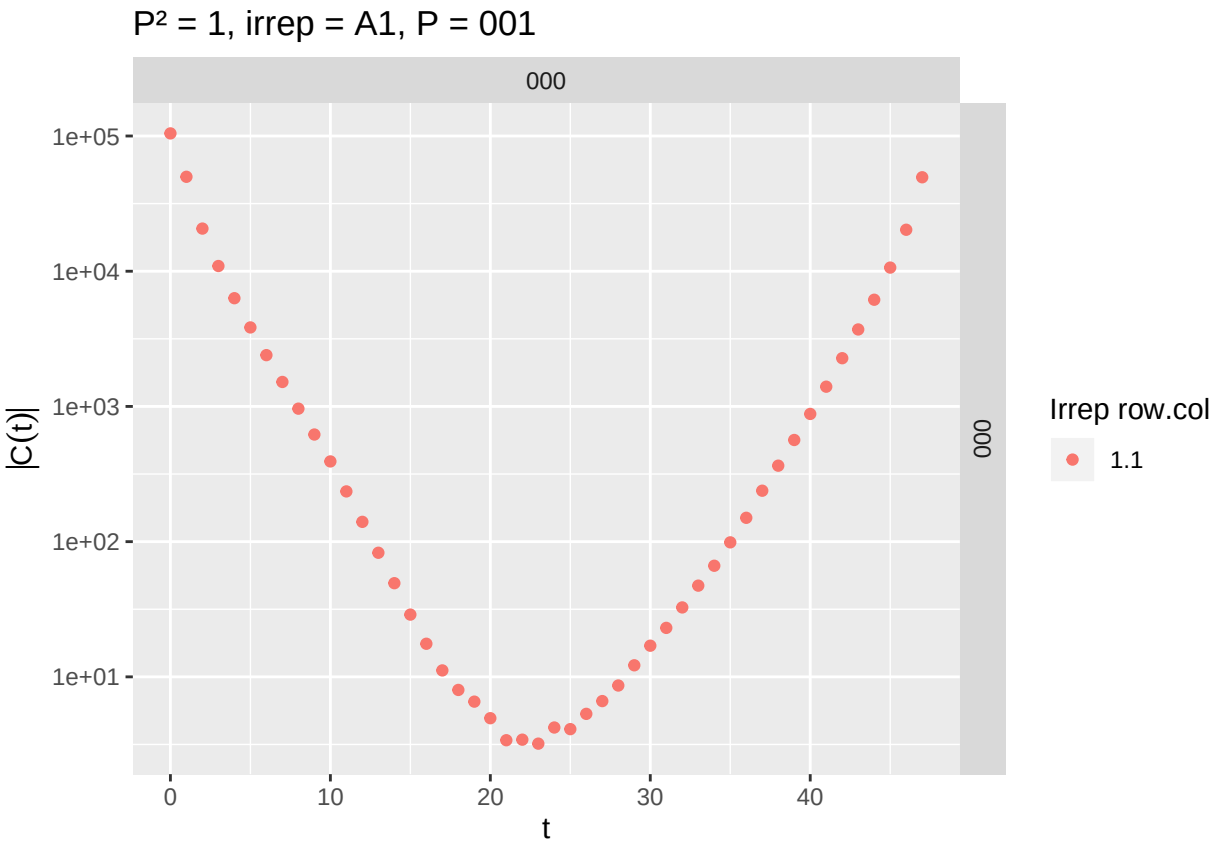
```
make_plot <- function (data) {
  ggplot(data,
         aes(x = time,
             y = abs(corr),
             color = interaction(irrep_row, irrep_col))) +
    geom_point() +
    scale_y_log10() +
    facet_grid(corr_row ~ corr_col) +
    labs(title = sprintf('P² = %d, irrep = %s, P = %s',
                         data$total_momentum_sq[1],
                         data$irrep[1],
                         data$total_momentum_str[1]),
         x = 't',
         y = expression(abs(C(t))),
         color = 'Irrep row.col')
}

plots <- parts_long %>%
  arrange(total_momentum_sq, irrep, total_momentum_str) %>%
  group_by(total_momentum_sq, irrep, total_momentum_str) %>%
  do(plot = make_plot(.))

for (plot in plots$plot) {
  print(plot)
  cat('\n\n')
}
```

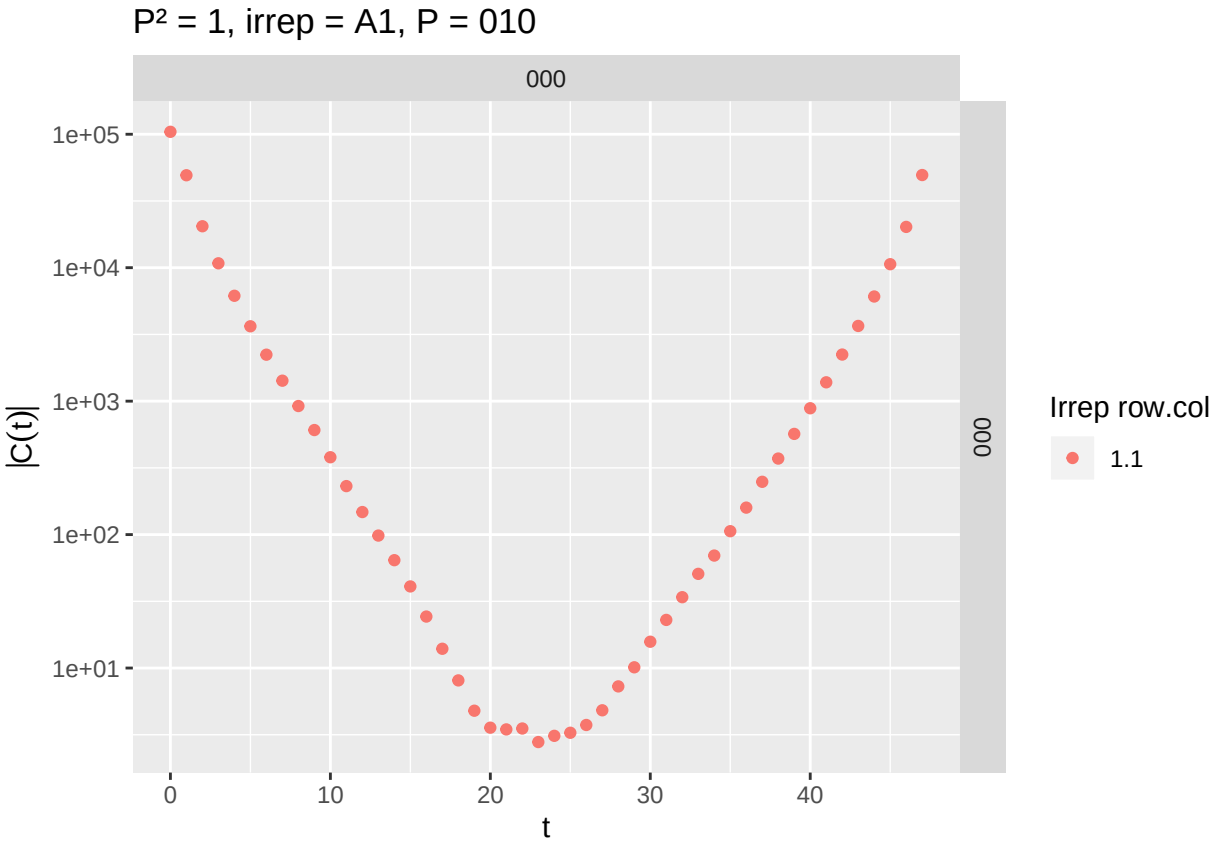

P² = 0, irrep = A1g, P = 000
000
001
1e+05
1e+03
1e+01
|C(t)|
0
10
20
30
40
t
Irrep row.col
1.1
P² = 0, irrep = Eg, P = 000
001
1e+02
1e+00
1e−02
2.1
1.2
2.2

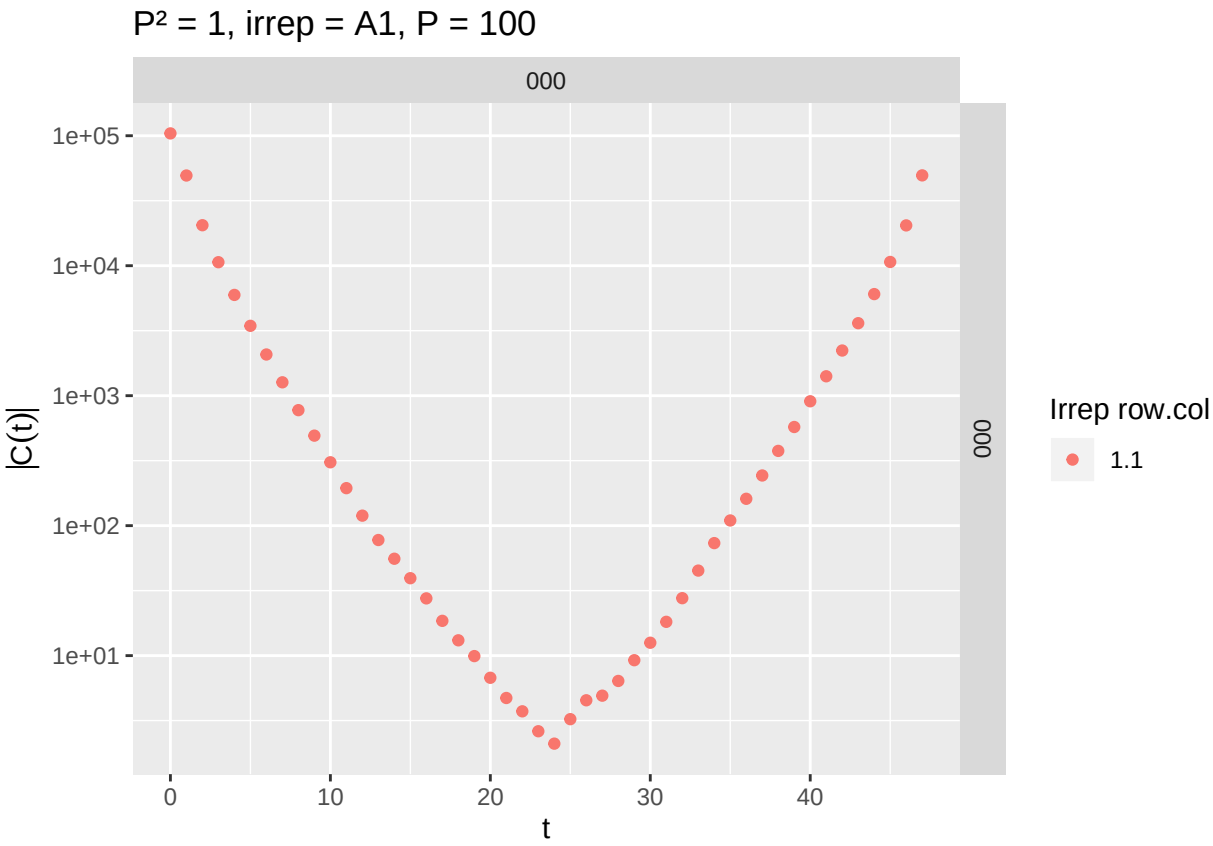

P² = 1, irrep = A1, P = −100
000
1e+05
1e+04
1e+03
1e+02
1e+01
|C(t)|
0
10
20
30
40
t
000
Irrep row.col
1.1


P² = 1, irrep = A1, P = 0−10
000
1e+05
1e+04
1e+03
1e+02
1e+01
|C(t)|
0
10
20
30
40
t
000
Irrep row.col
1.1


P² = 1, irrep = A1, P = 00−1
000
1e+05
1e+04
1e+03
1e+02
1e+01
|C(t)|
0
10
20
30
40
t
000
Irrep row.col
1.1


P² = 1, irrep = A1, P = 001
000
1e+05
1e+04
1e+03
1e+02
1e+01
|C(t)|
0
10
20
30
40
t
000
Irrep row.col
1.1


P² = 1, irrep = A1, P = 010
000
1e+05
1e+04
1e+03
1e+02
1e+01
|C(t)|
0
10
20
30
40
t
000
Irrep row.col
1.1


P² = 1, irrep = A1, P = 100
000
1e+05
1e+04
1e+03
1e+02
1e+01
|C(t)|
0
10
20
30
40
t
000
Irrep row.col
1.1