

Correlator Matrix Visualization

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```
total_momentum_str_to_vec <- function (total_momentum_str) {
  parts <- stringr::str_match(total_momentum_str, '(-?\d)(-?\d)(-?\d)')
  sapply(parts[1, 2:4], as.integer)
}

workdir_candidates <- c(
  '~/Lattice/NG2',
  '~/NG2'
)

for (path in workdir_candidates) {
  if (dir.exists(path)) {
    workdir <- path
    break
  }
}

all_projected_paths <- Sys.glob(paste0(workdir, '/projected/resolved_*_*_2552.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))),

```

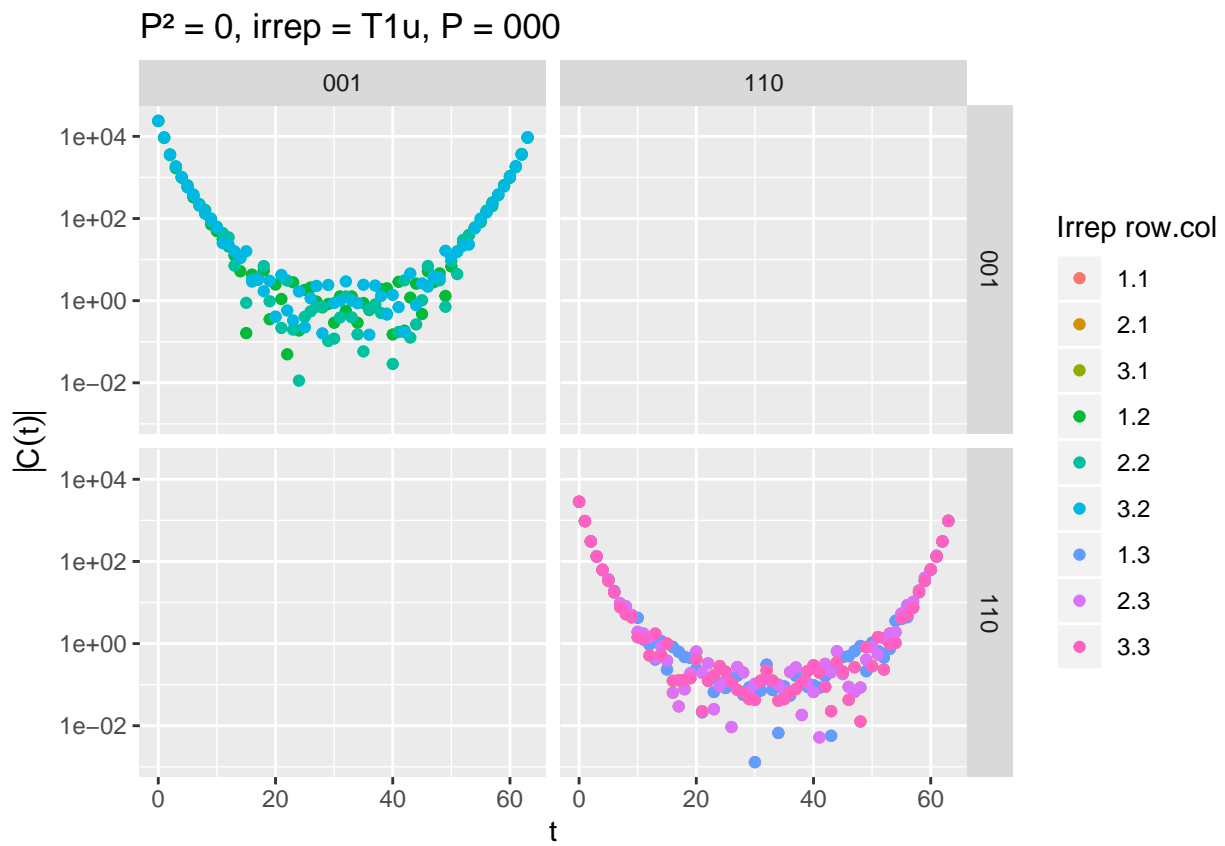
```

    color = 'Irrep row.col')
}

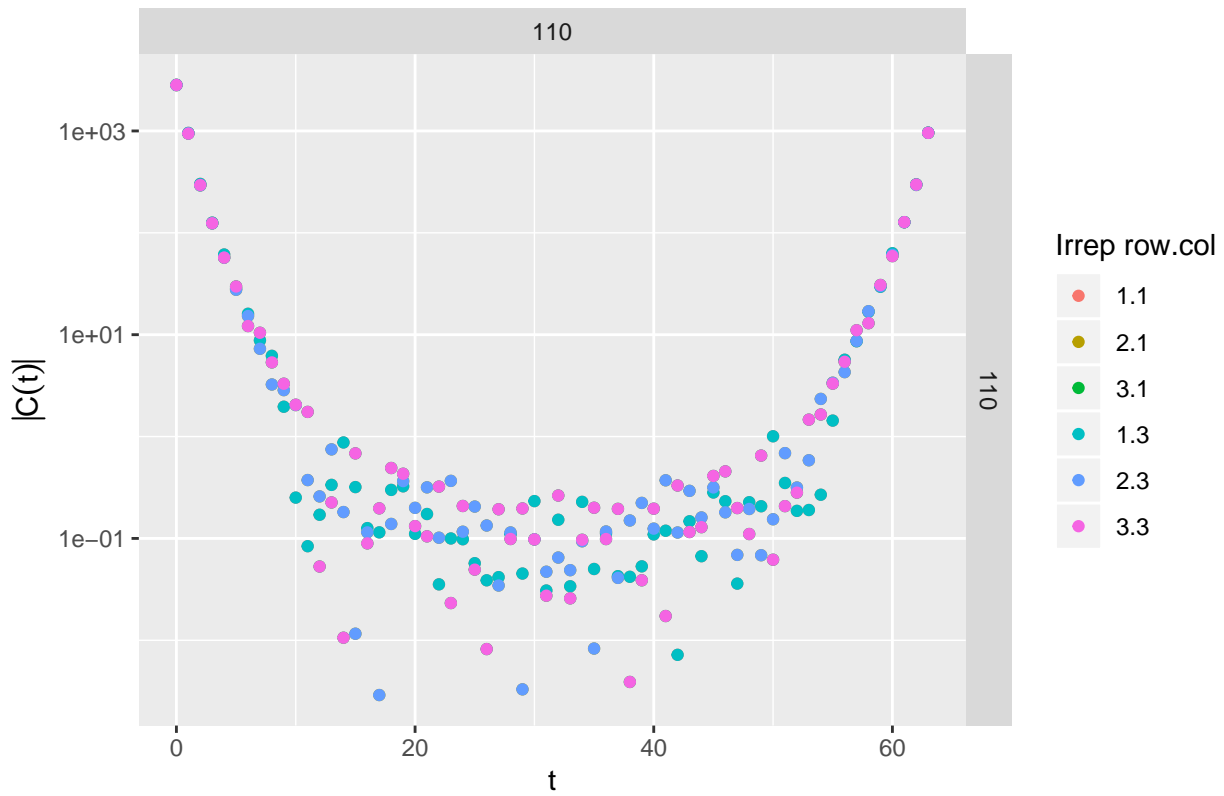
plots <- parts_long %>%
  arrange(total_momentum_sq, irrep, total_momentum_str) %>%
  group_by(total_momentum_sq, irrep, total_momentum_str) %>%
  do(plot = make_plot(.))

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

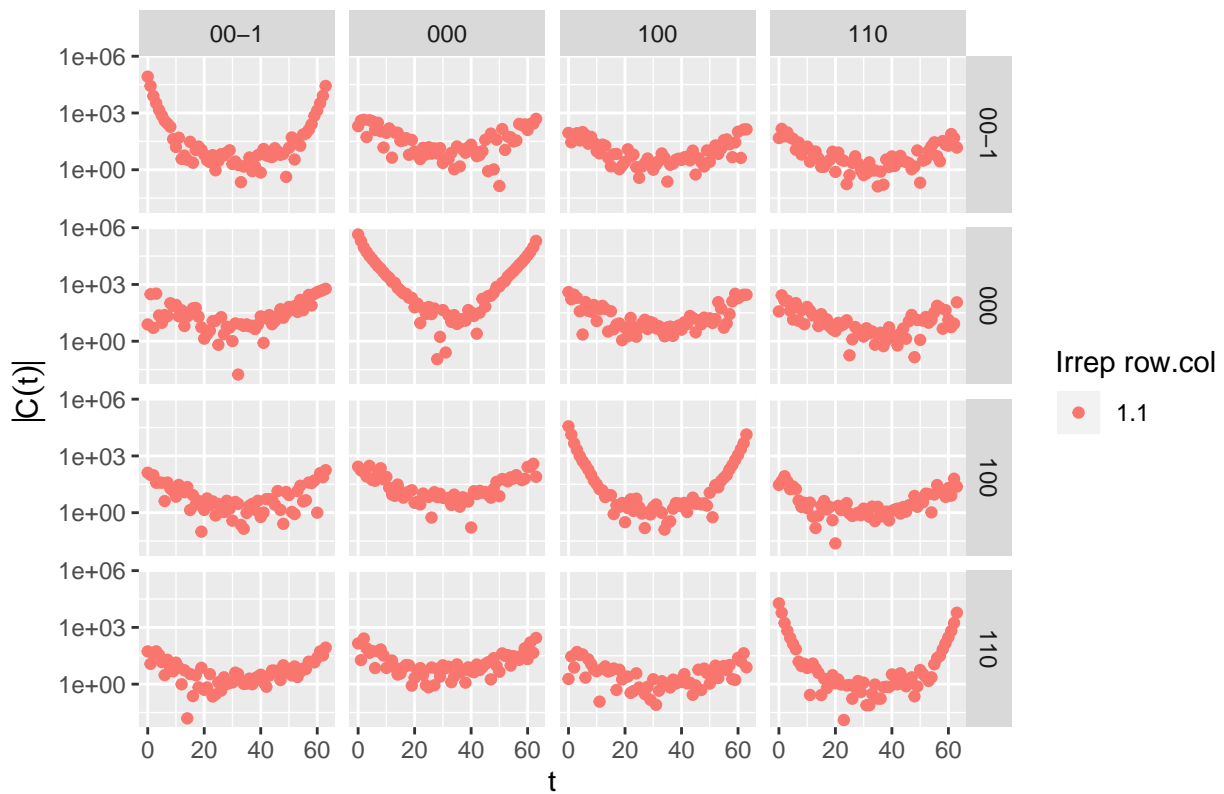
```



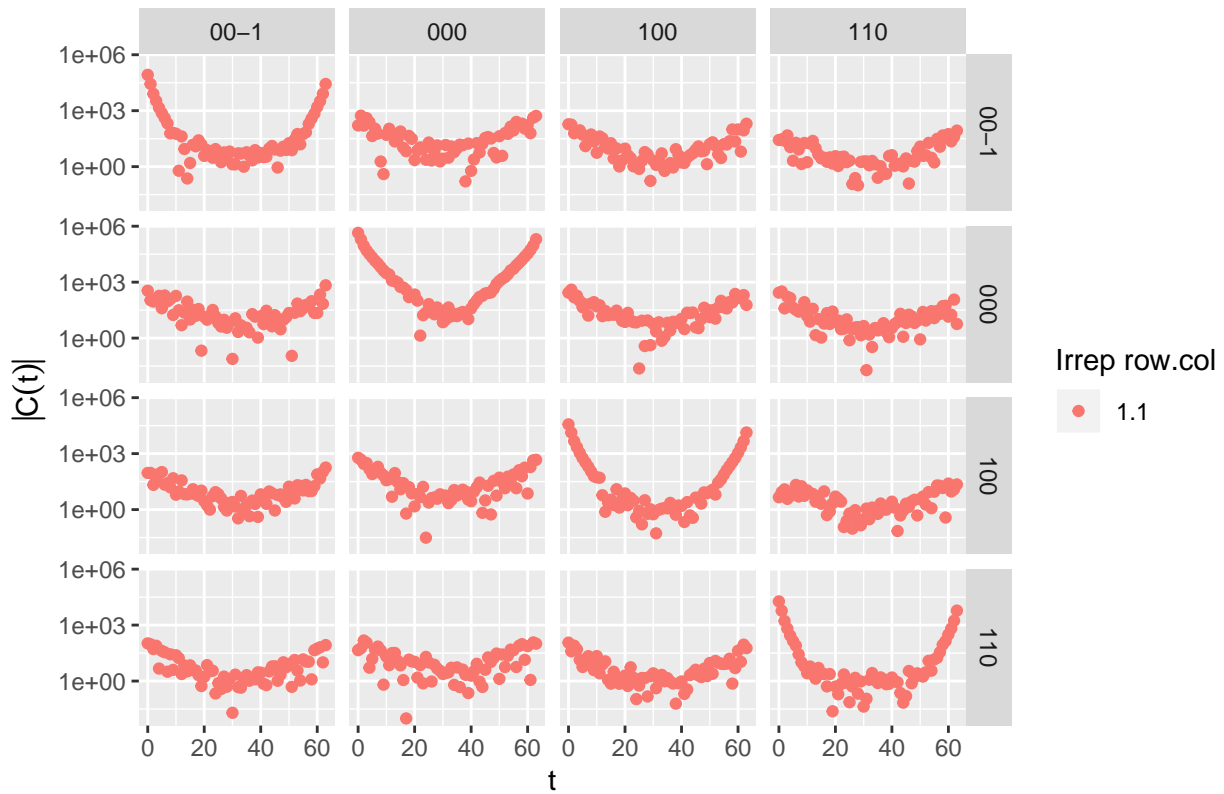
$P^2 = 0$, irrep = T2u, P = 000



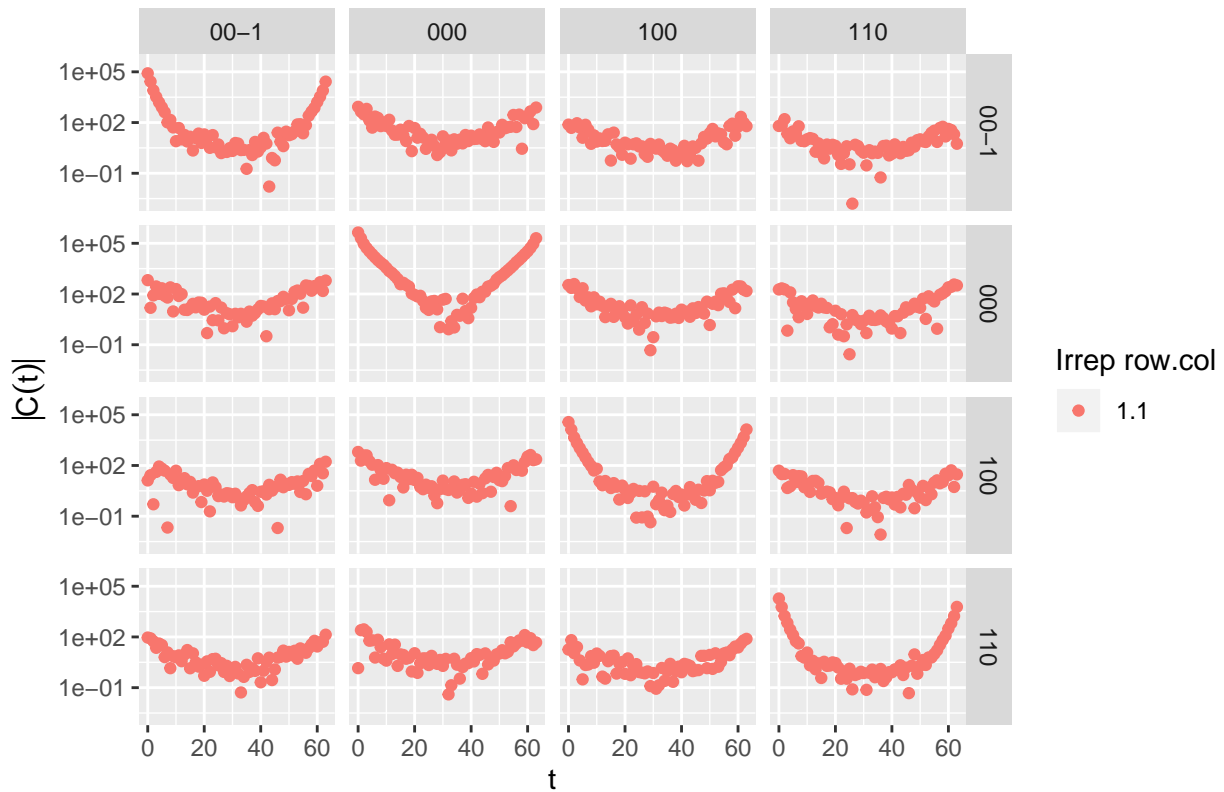
$P^2 = 1$, irrep = A1, P = -100



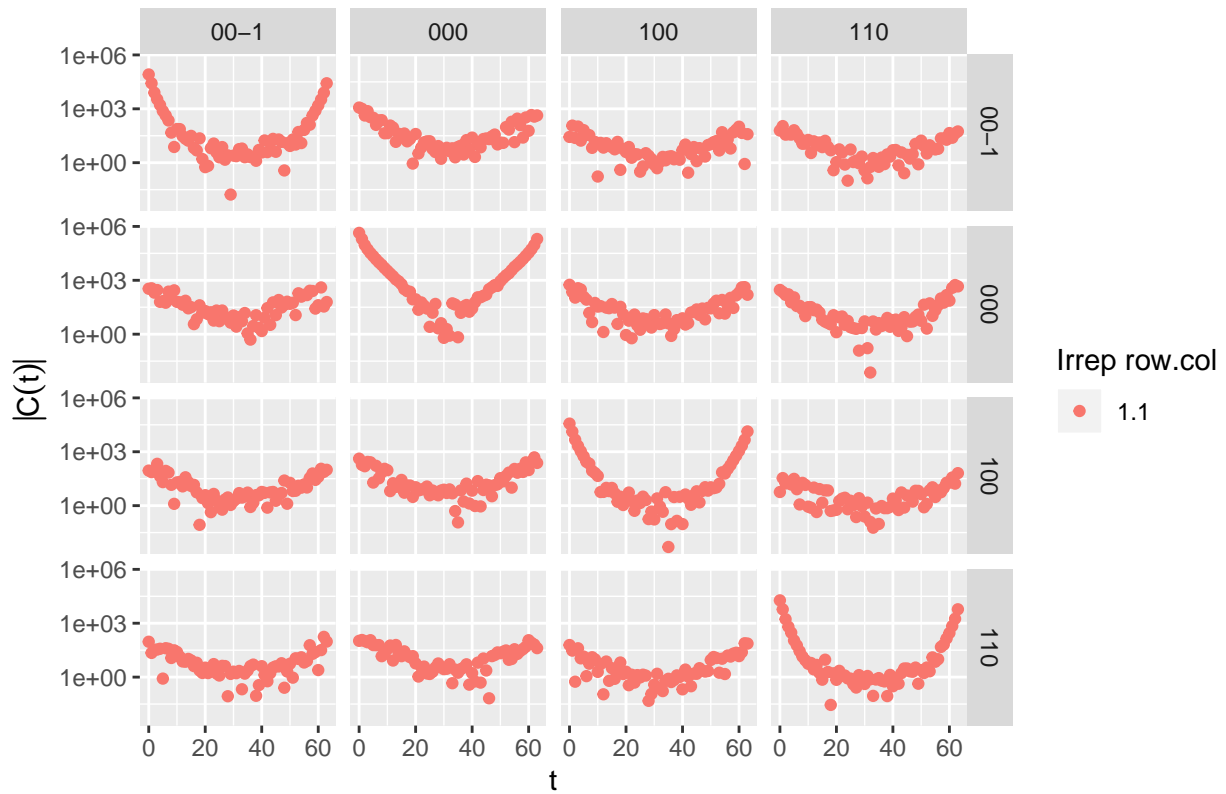
$P^2 = 1$, irrep = A1, P = 0-10



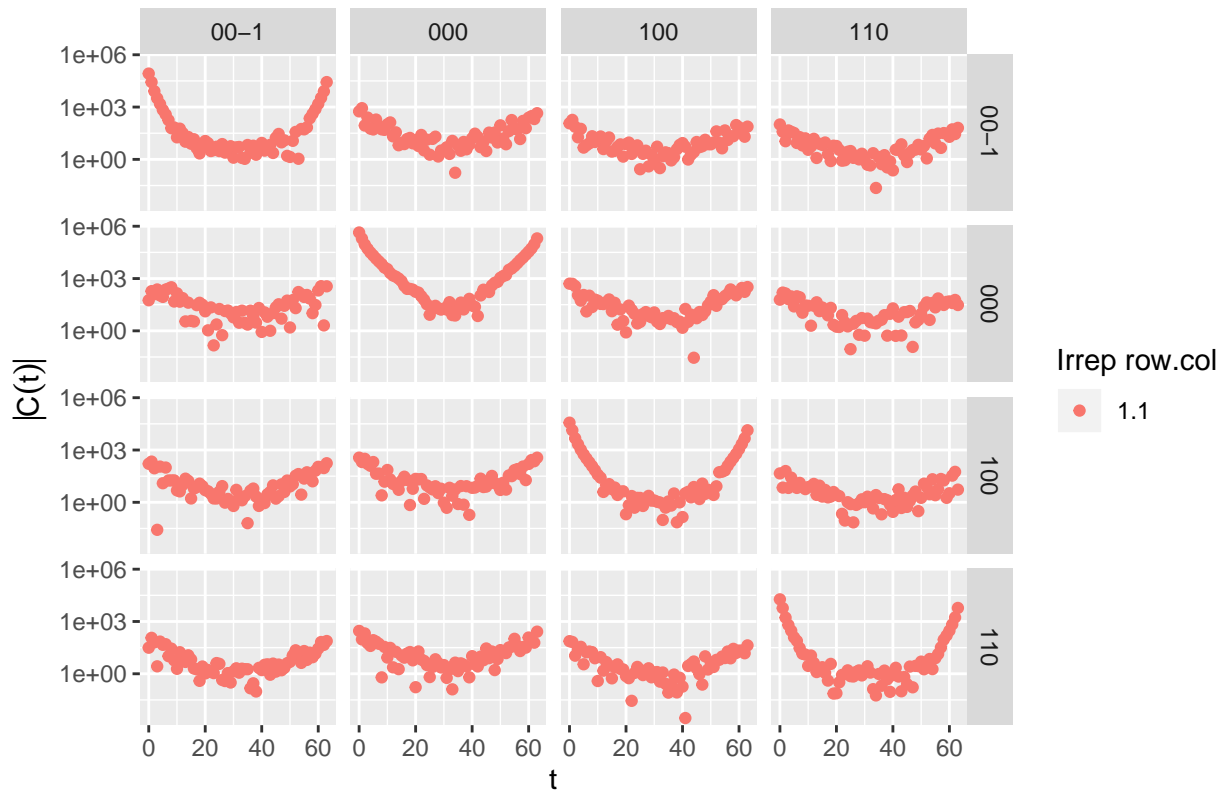
$P^2 = 1$, irrep = A1, P = 00-1



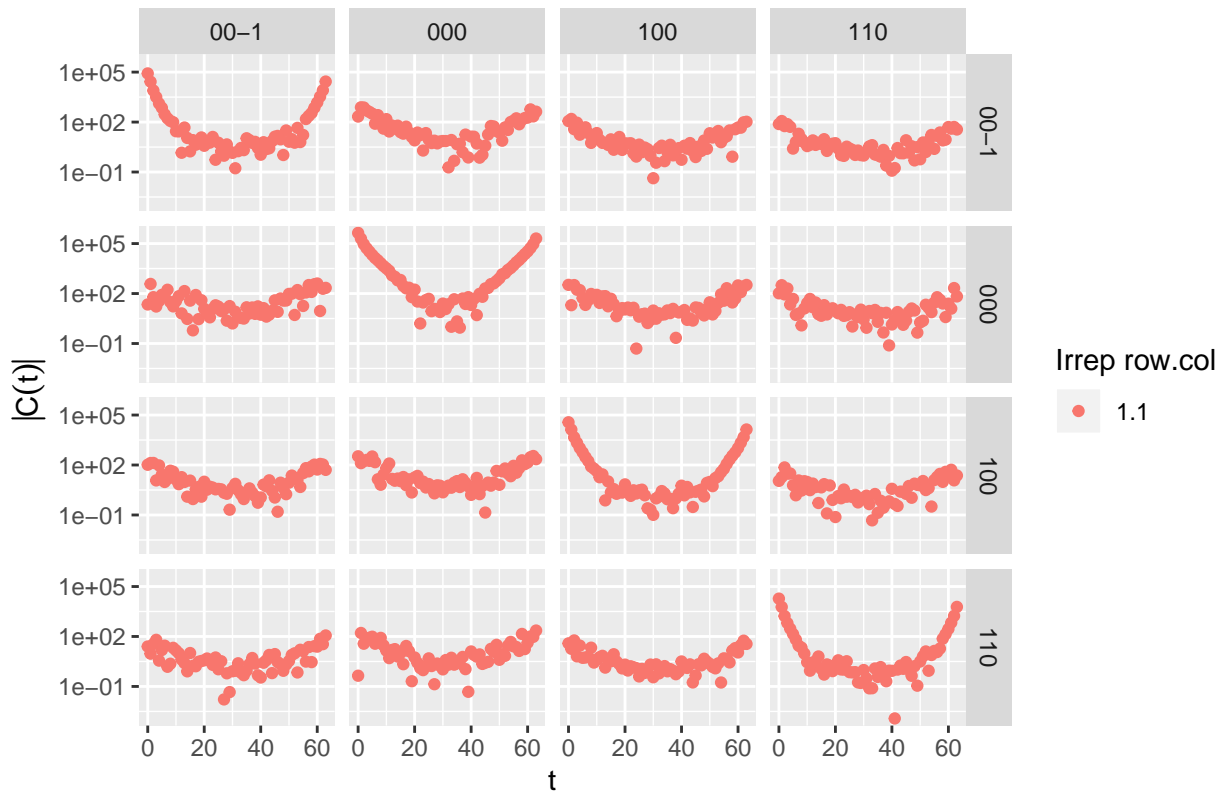
$P^2 = 1$, irrep = A1, P = 001



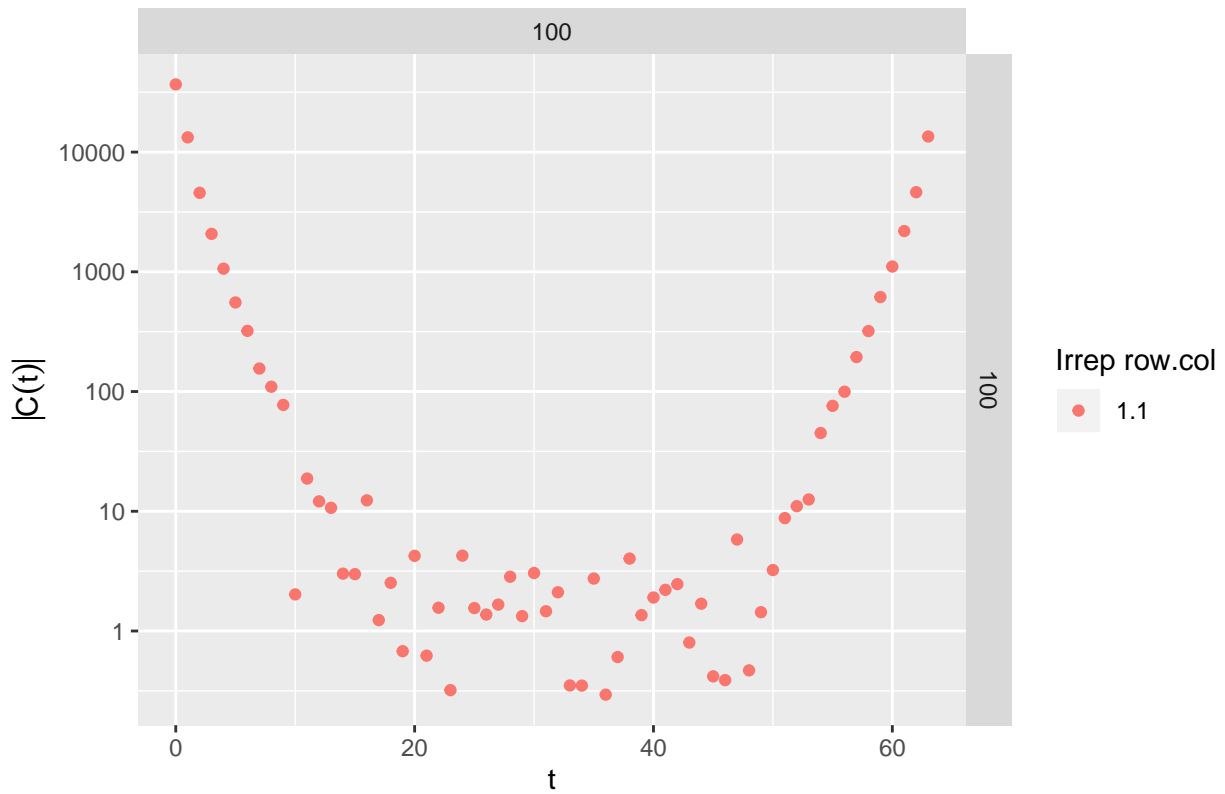
$P^2 = 1$, irrep = A1, P = 010



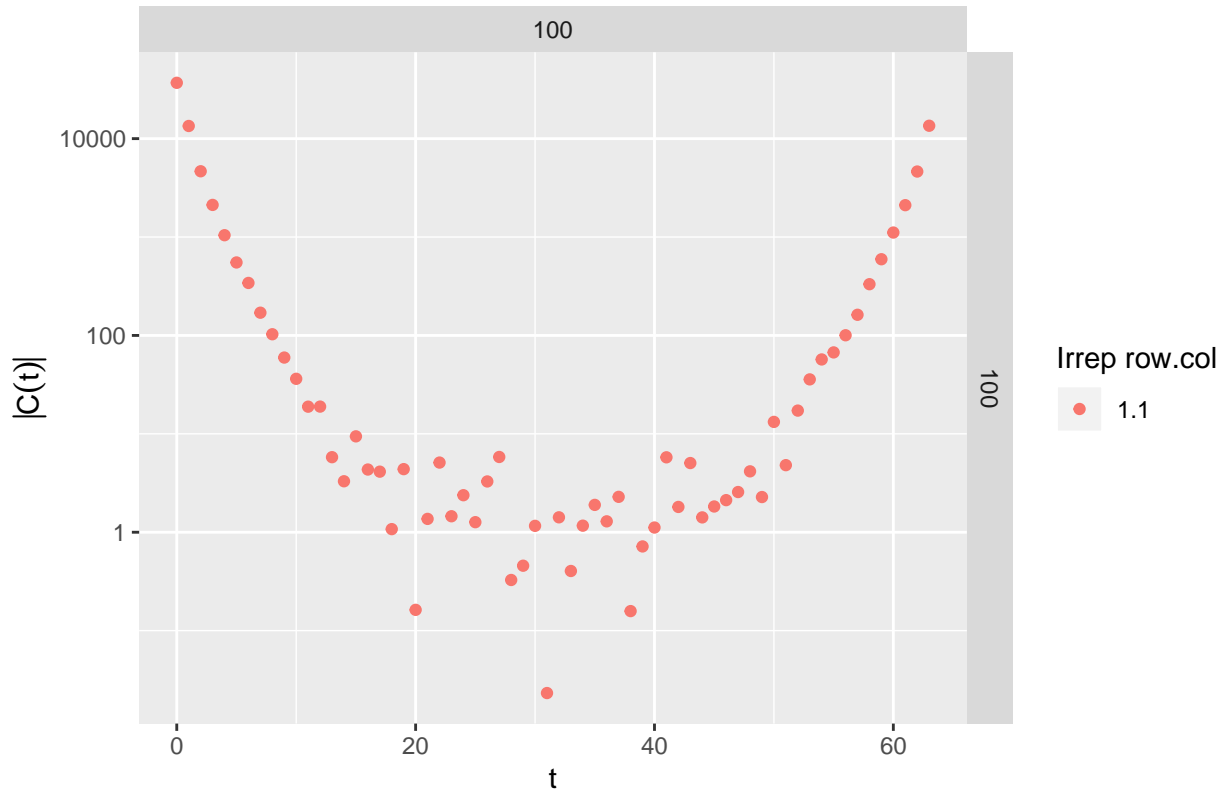
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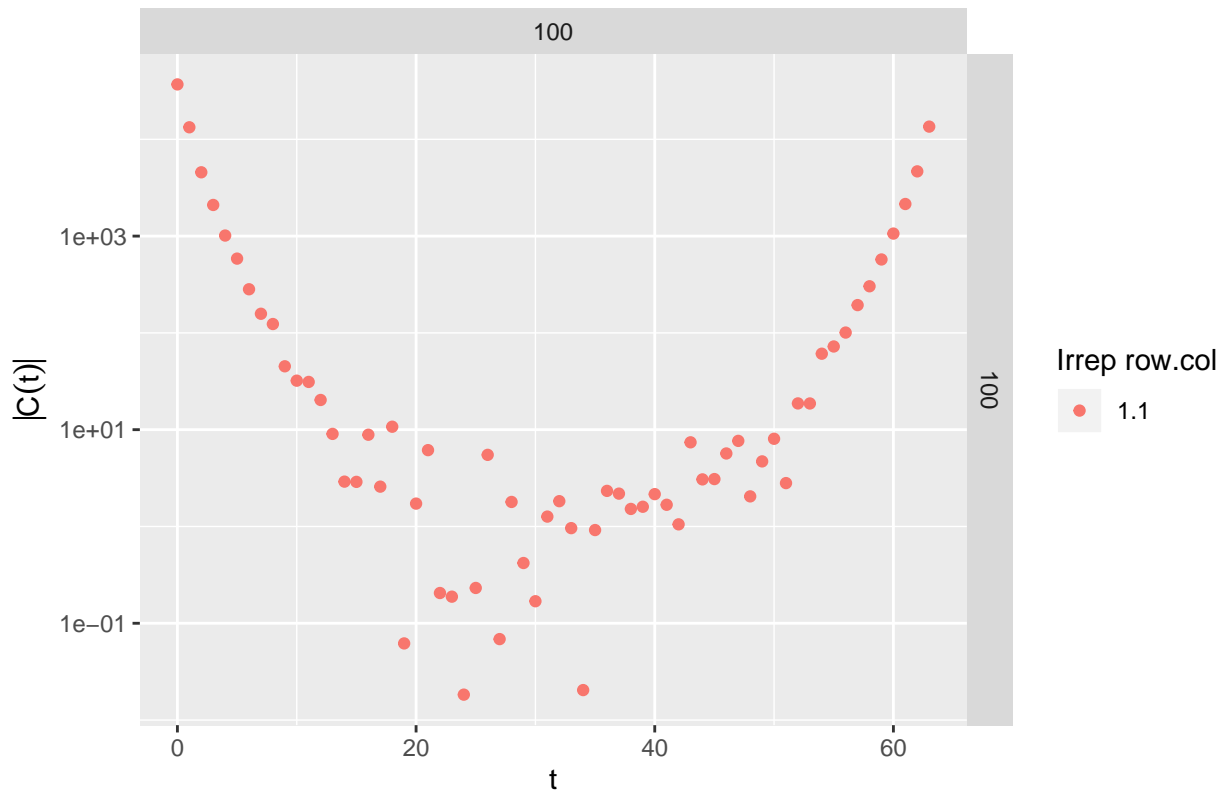
$P^2 = 1$, irrep = B1, $P = -100$



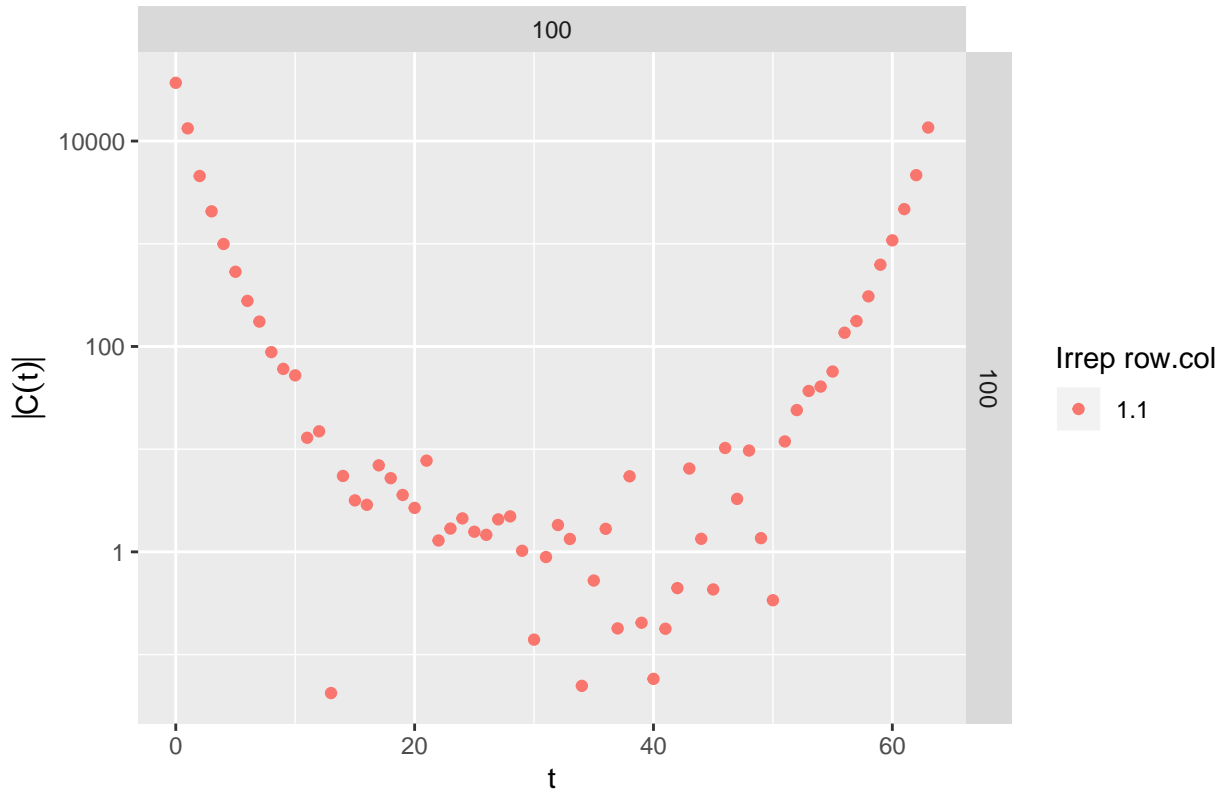
$P^2 = 1$, irrep = B1, P = 0-10



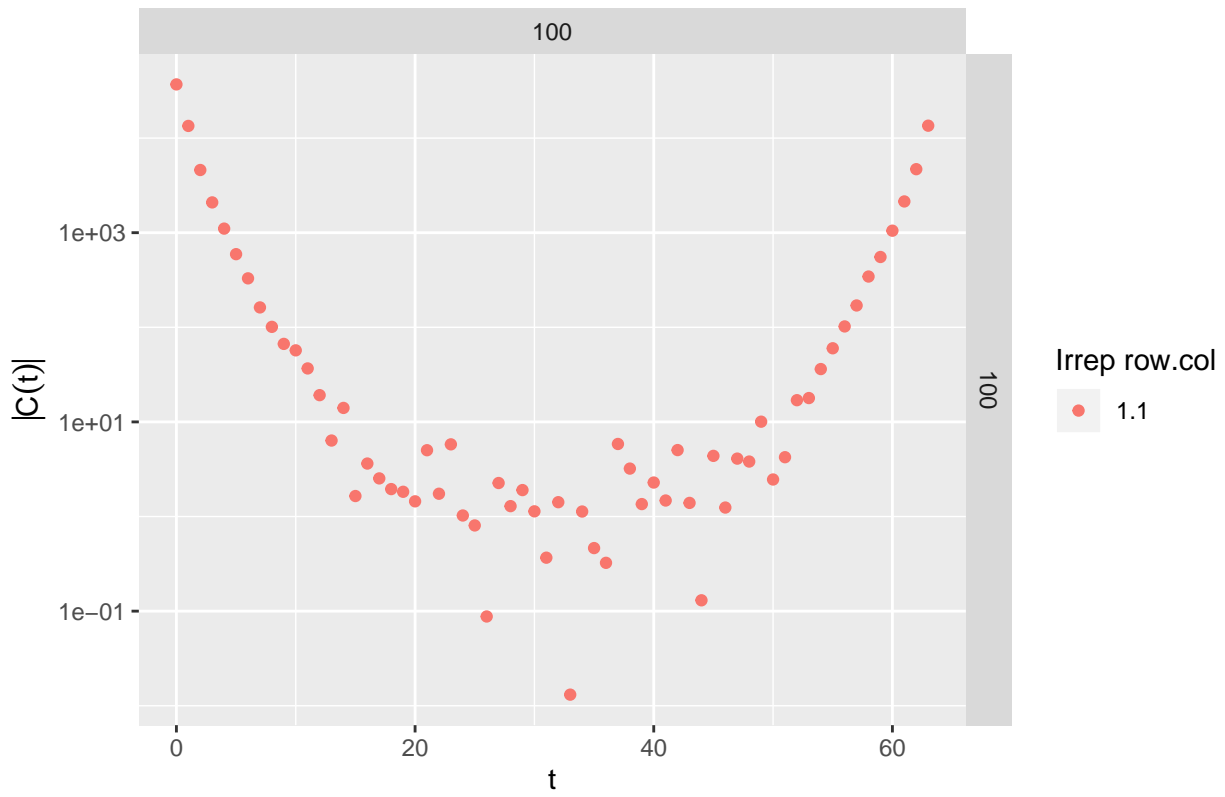
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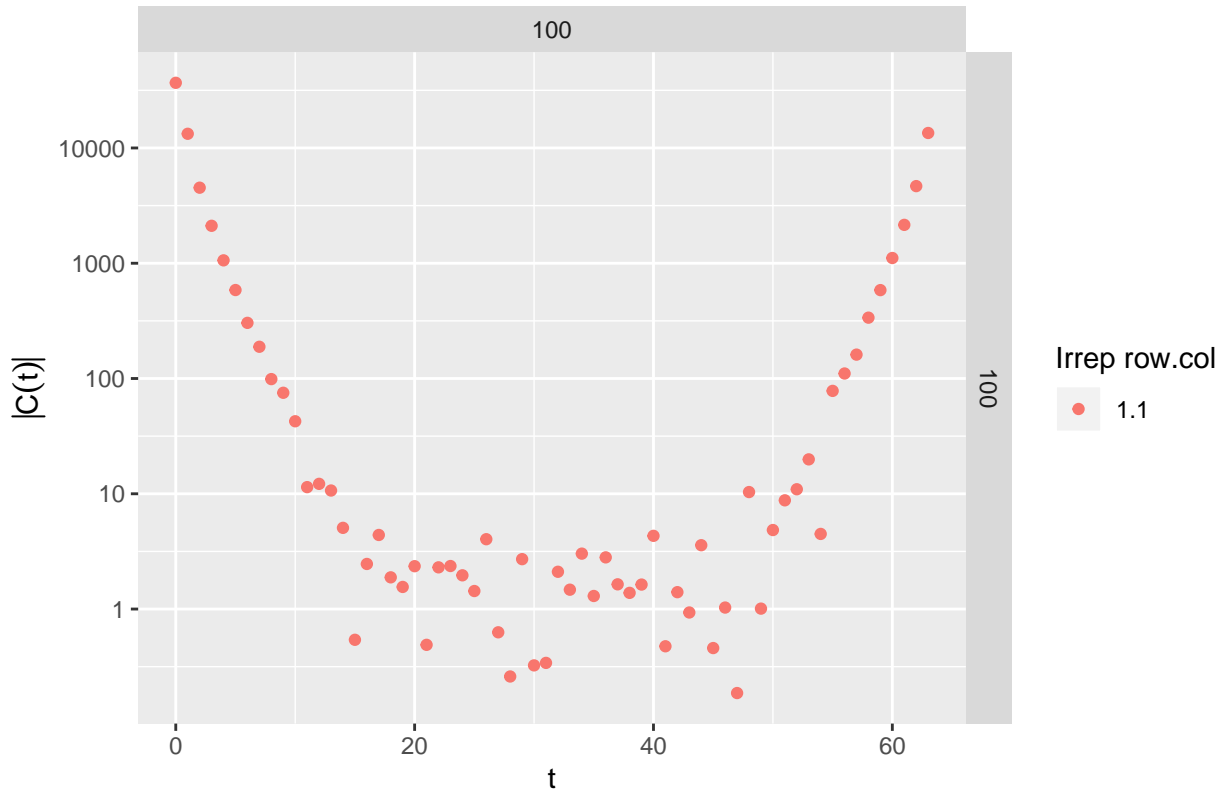
$P^2 = 1$, irrep = B1, $P = 001$



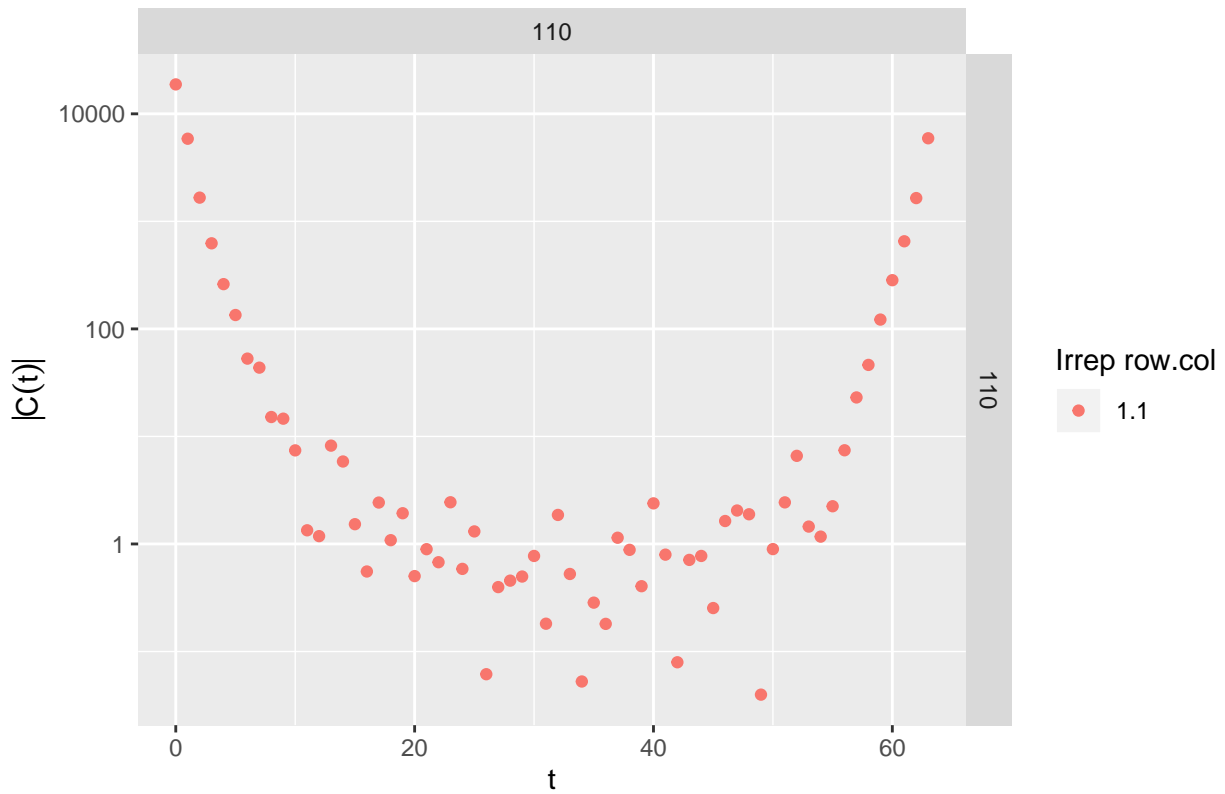
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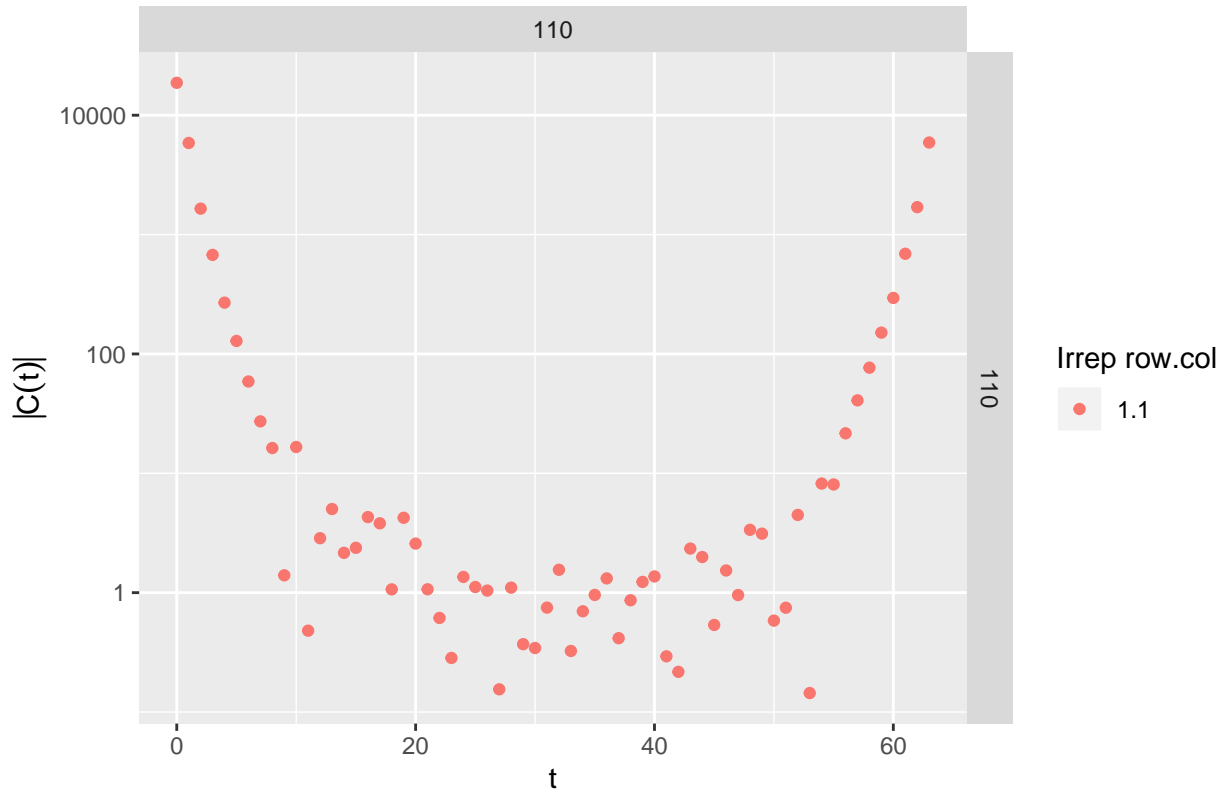
$P^2 = 1$, irrep = B1, $P = 100$



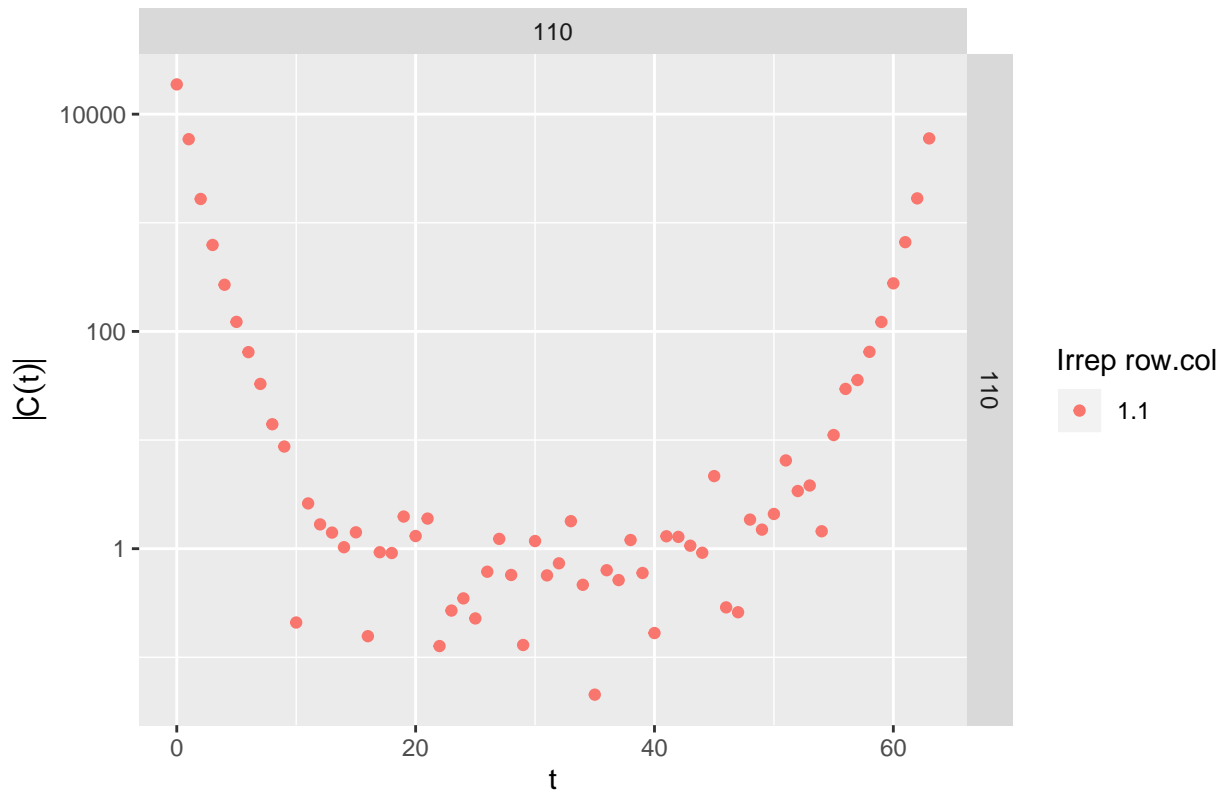
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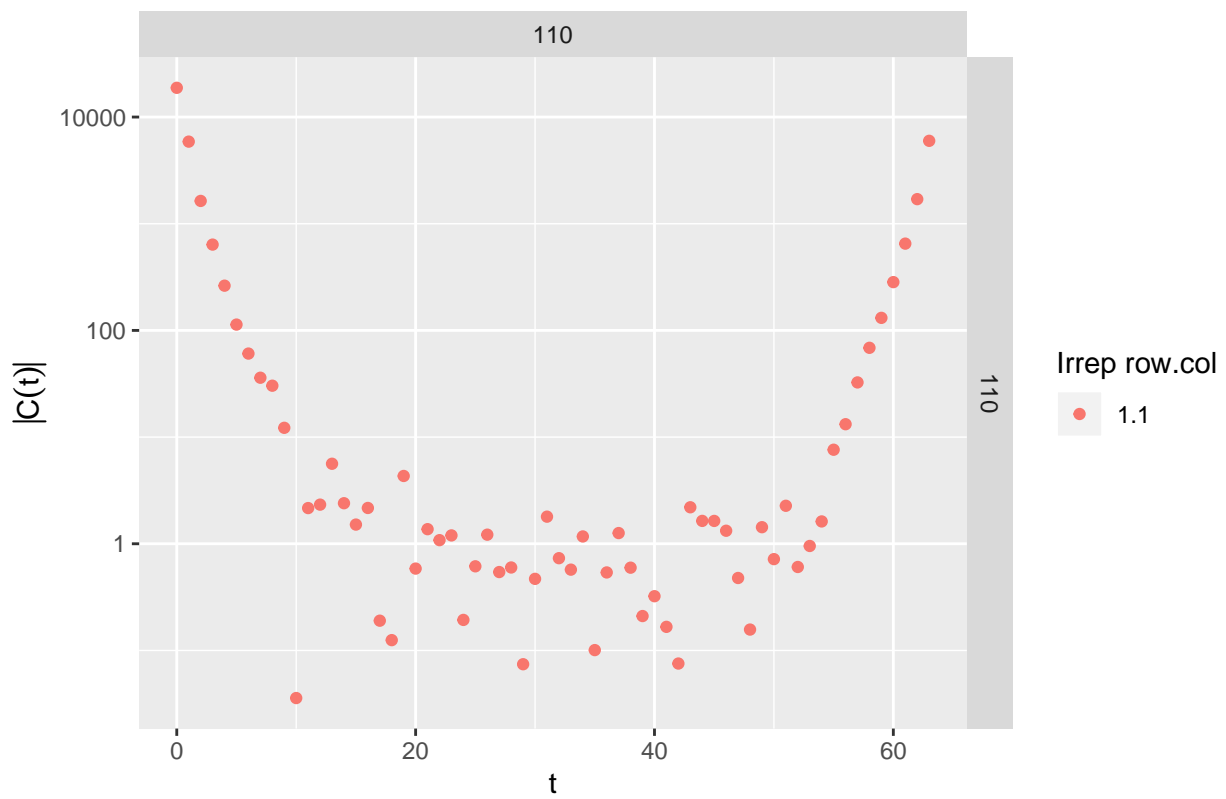
$P^2 = 1$, irrep = B2, P = 0-10



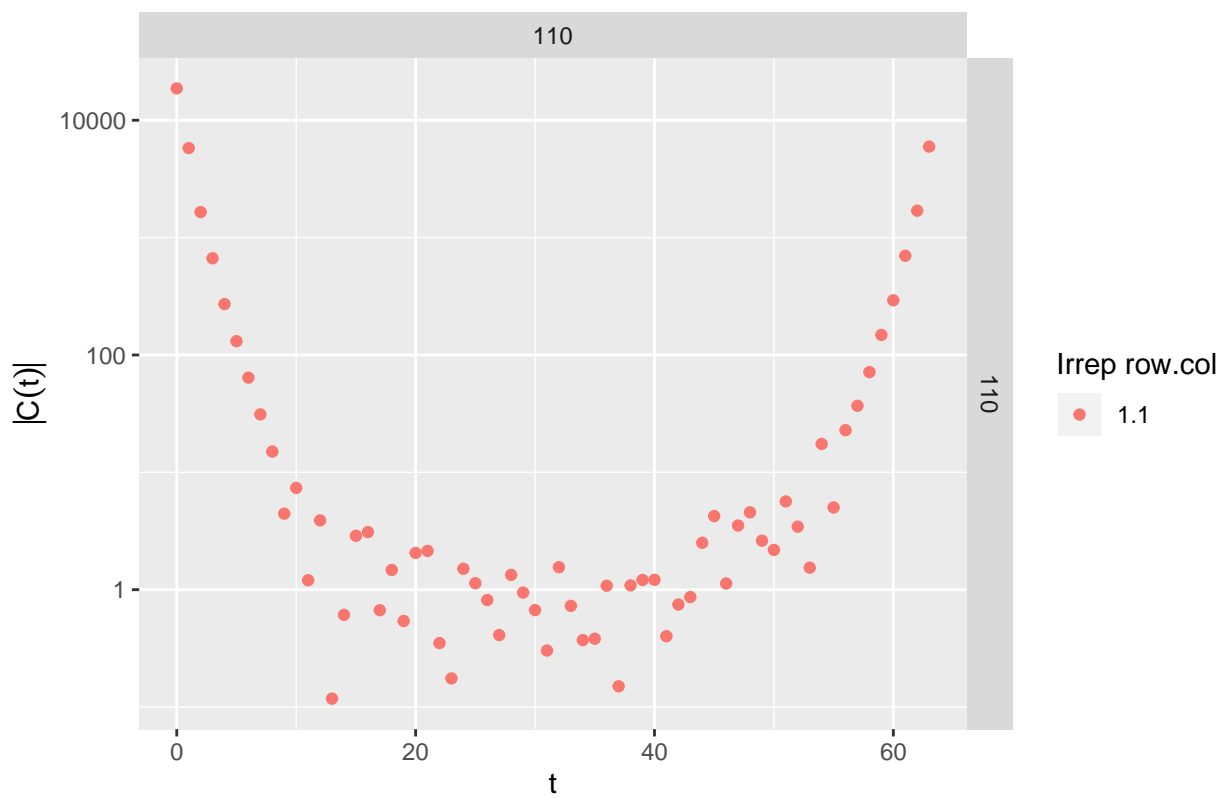
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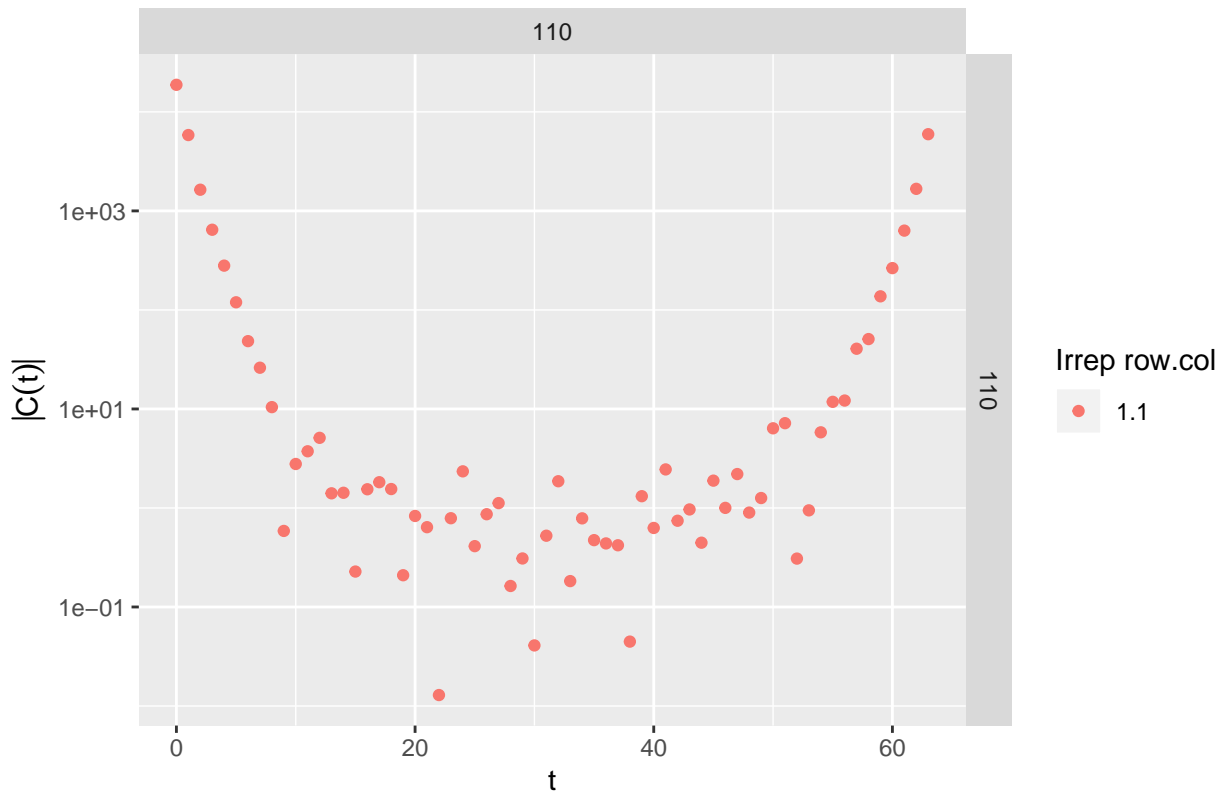
$P^2 = 1$, irrep = B2, P = 001



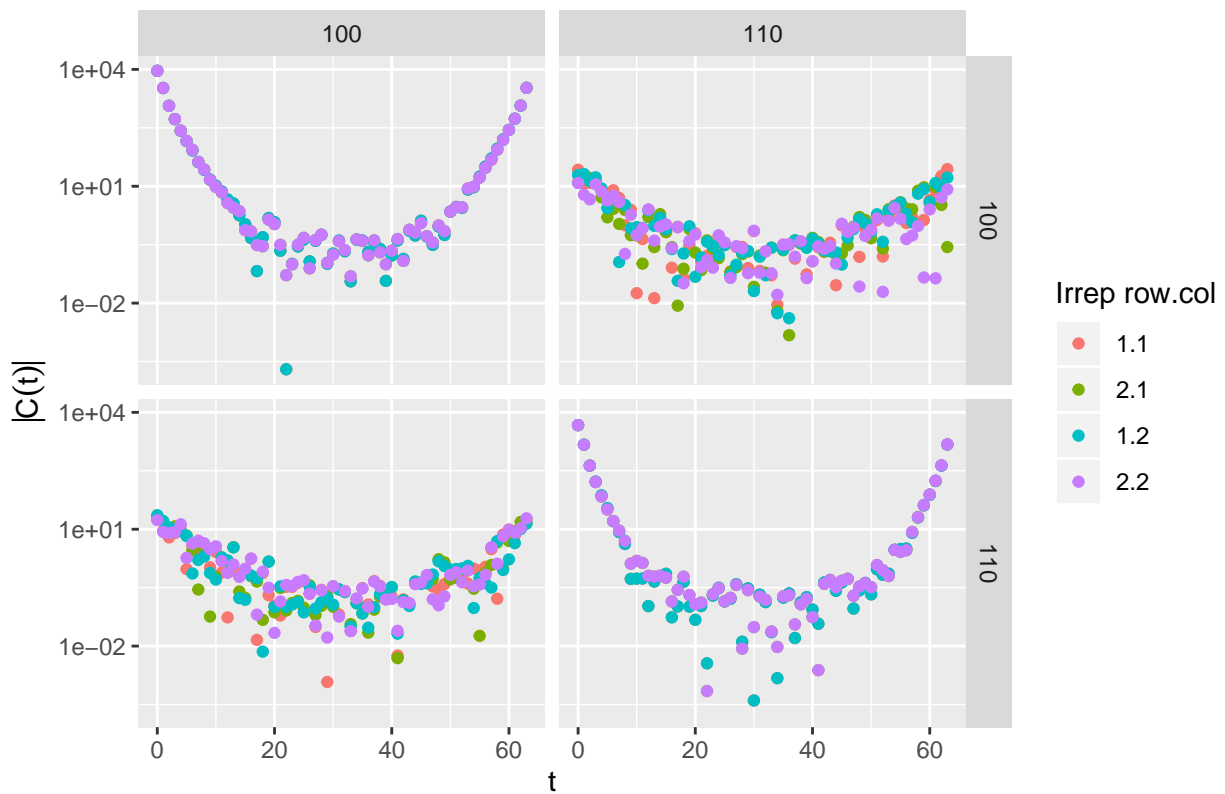
$P^2 = 1$, irrep = B2, P = 010



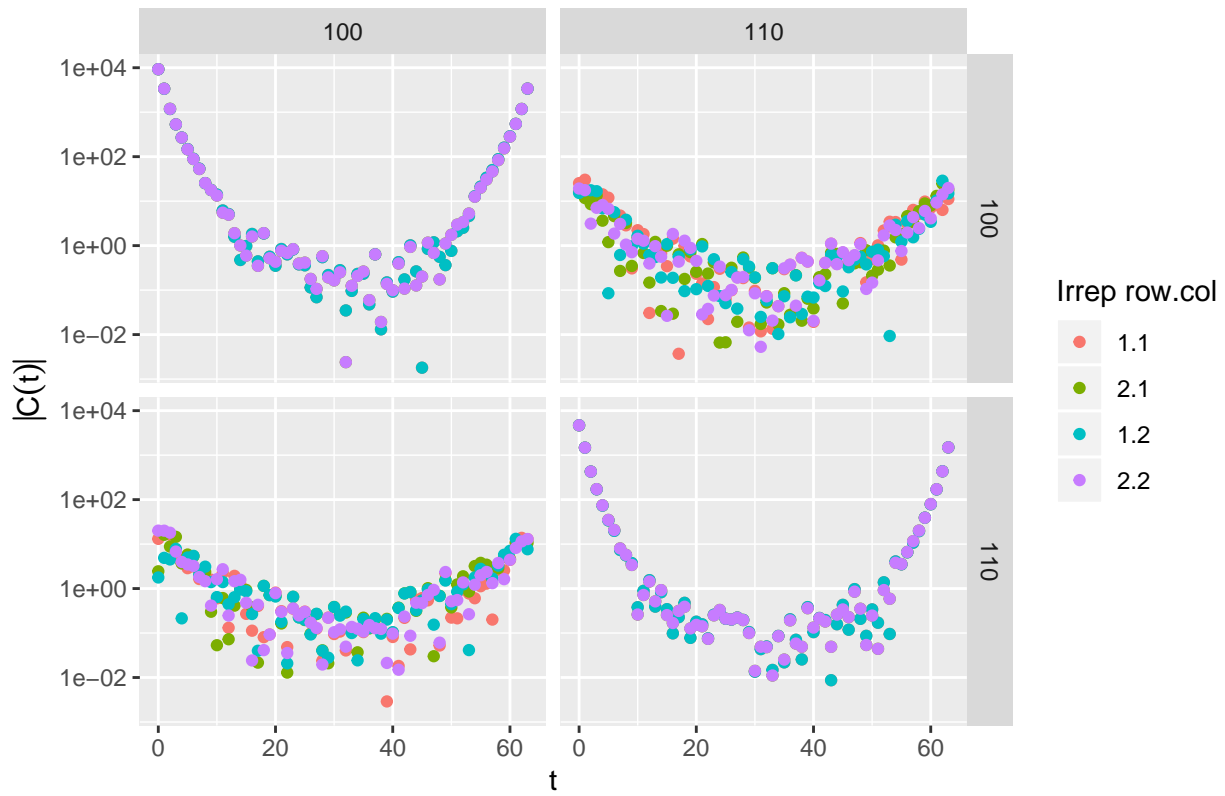
$P^2 = 1$, irrep = B2, $P = 100$



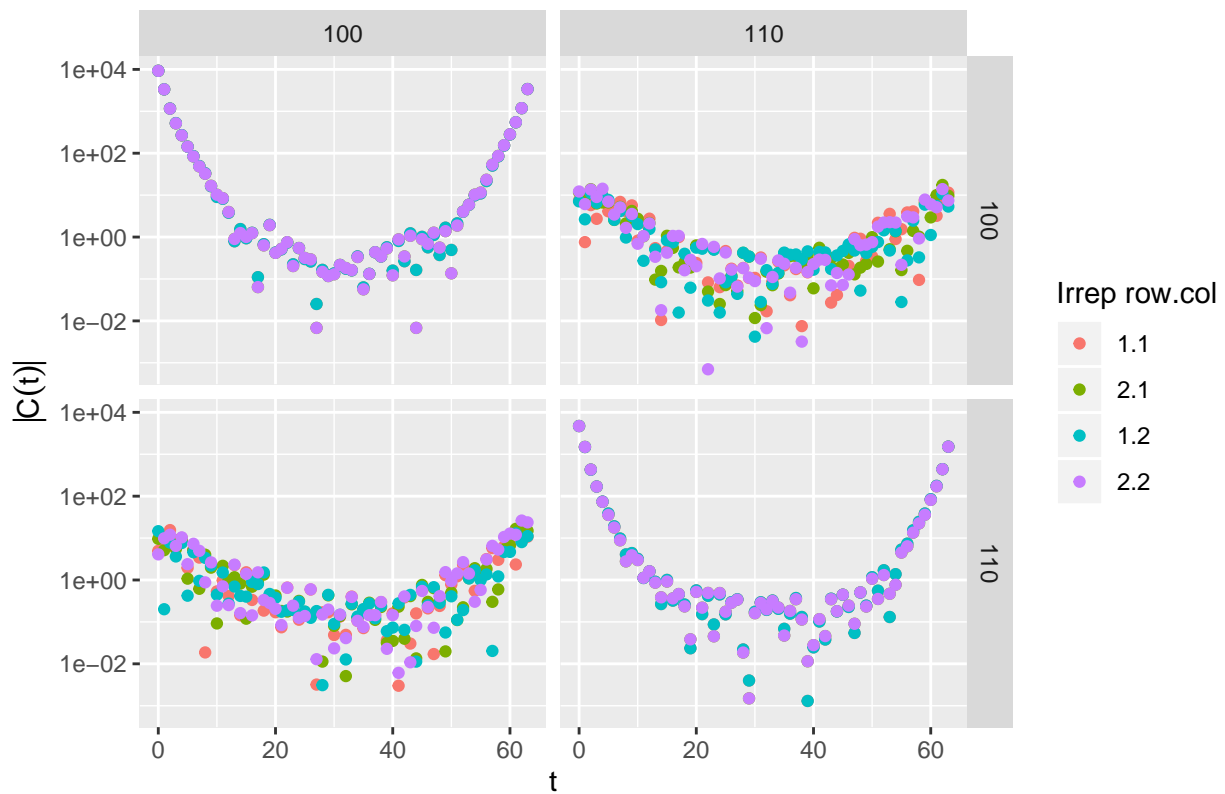
$P^2 = 1$, irrep = E, $P = -100$



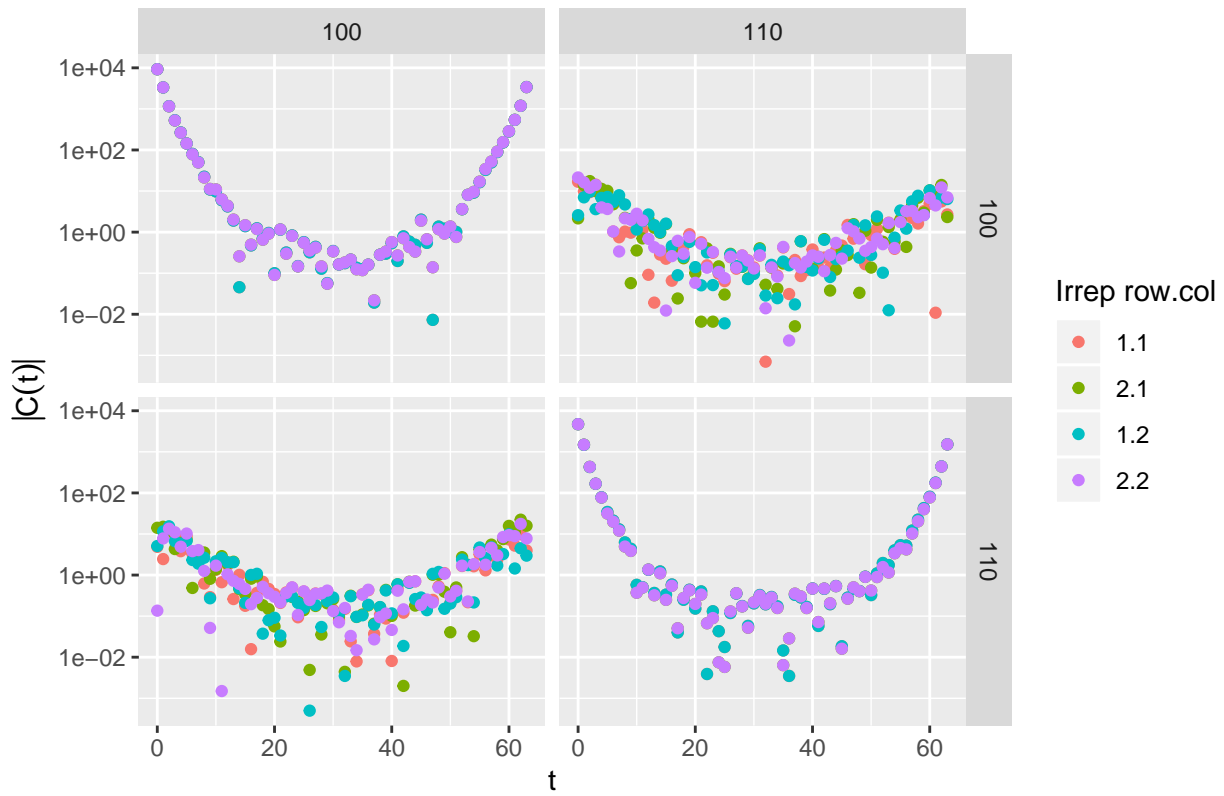
$P^2 = 1$, irrep = E, P = 0-10



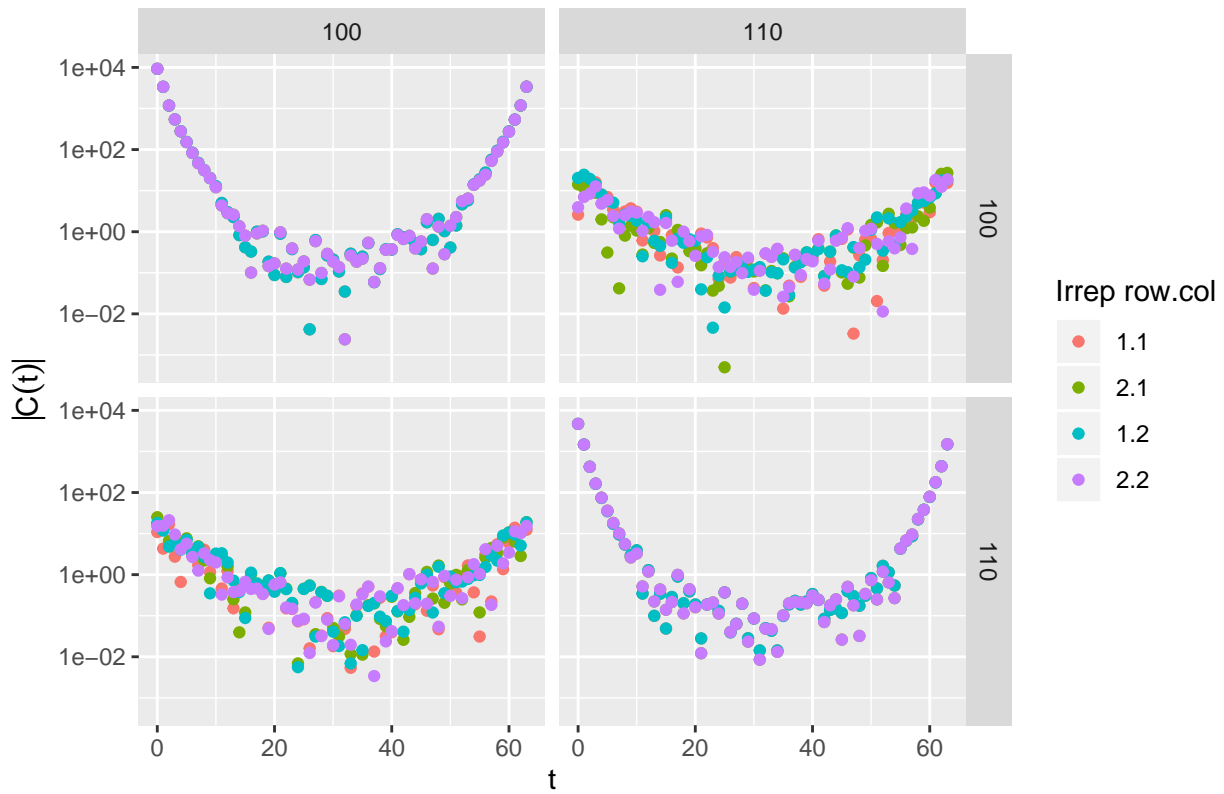
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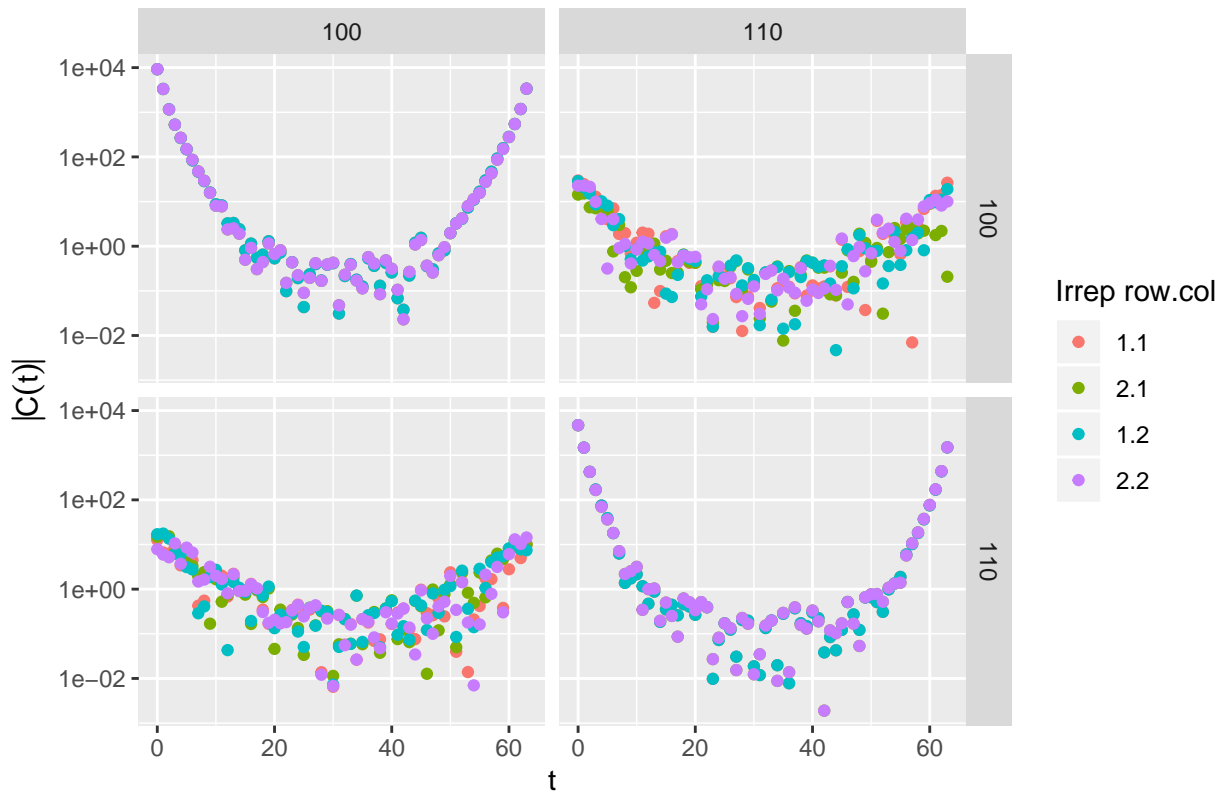
$P^2 = 1$, irrep = E, $P = 001$



$P^2 = 1$, irrep = E, $P = 010$

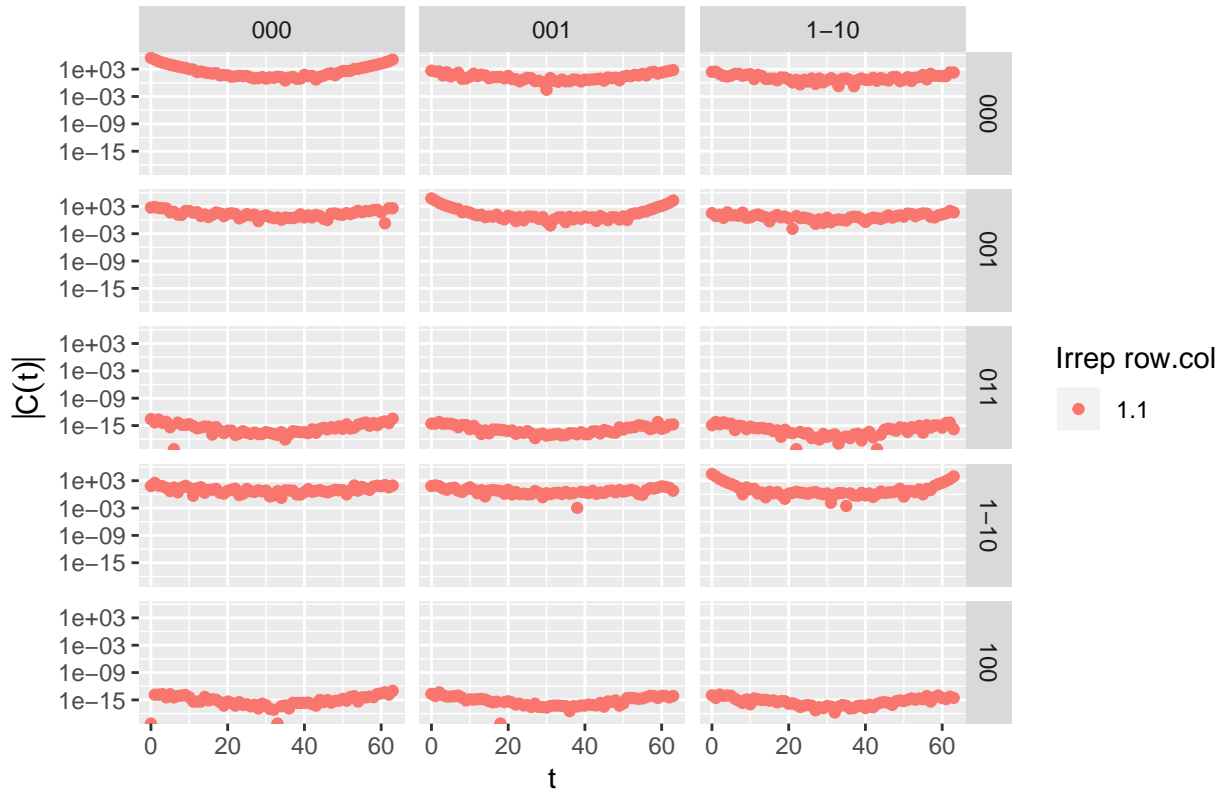


$P^2 = 1$, irrep = E, $P = 100$



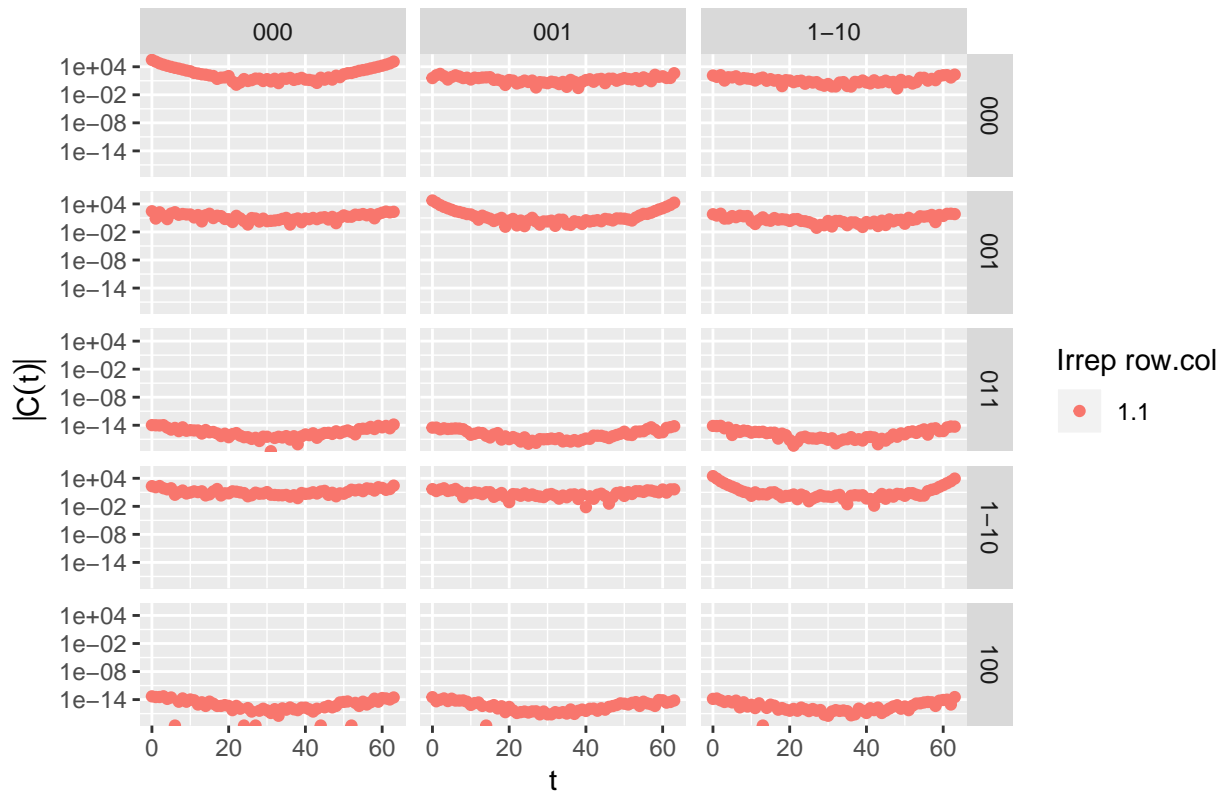
Warning: Transformation introduced infinite values in continuous y-axis

$P^2 = 2$, irrep = A1, $P = -1-10$



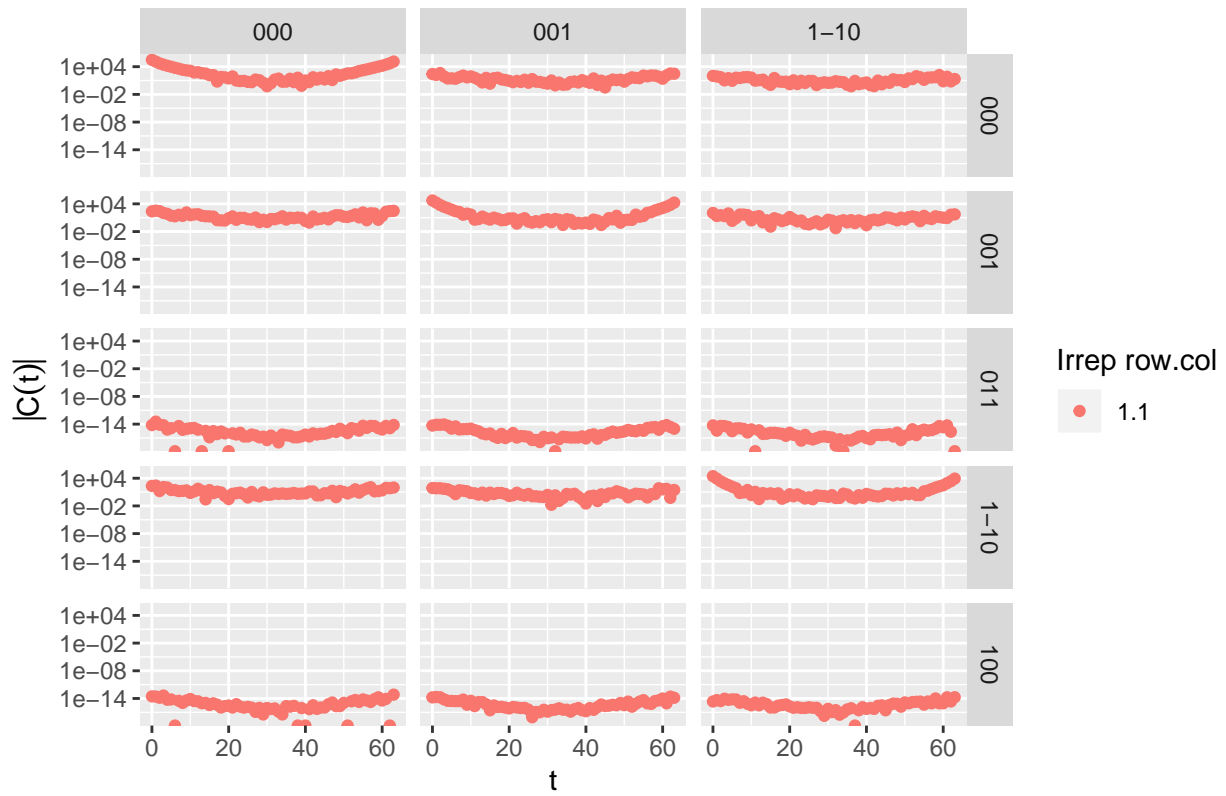
Warning: Transformation introduced infinite values in continuous y-axis

$P^2 = 2$, irrep = A1, $P = -10-1$



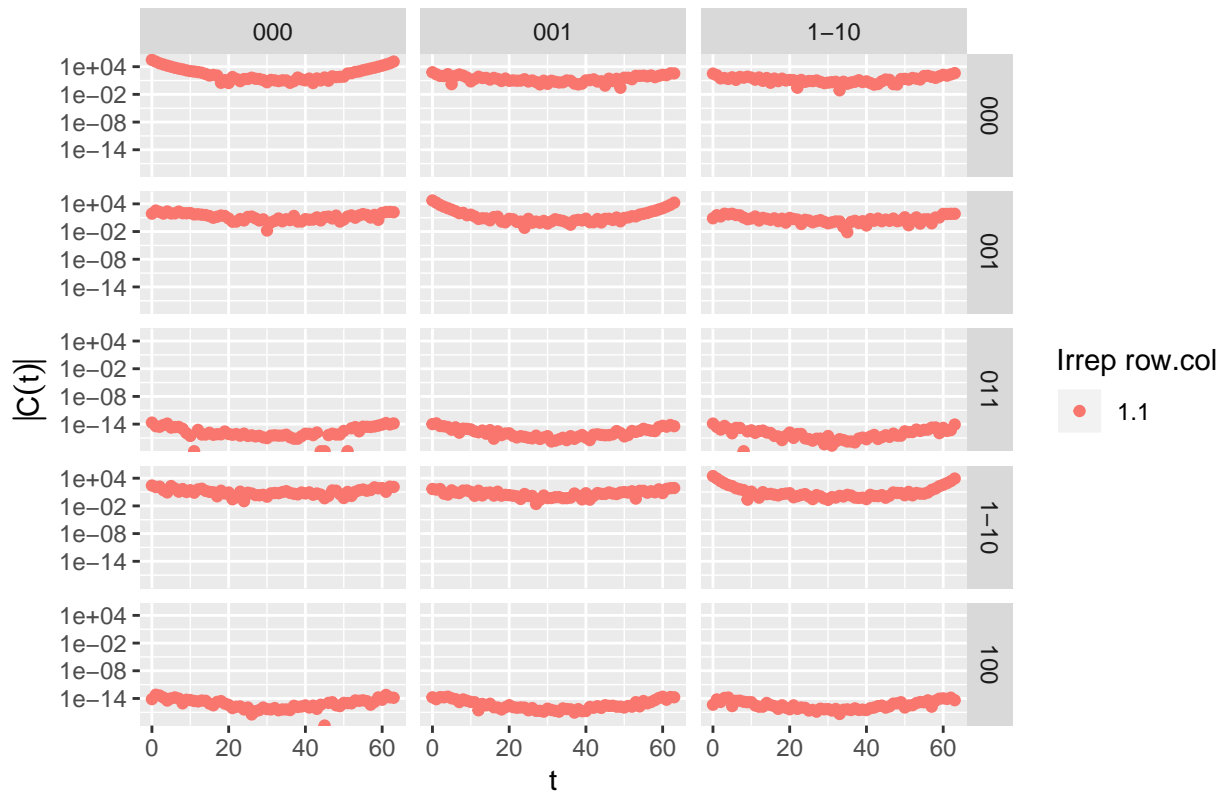
Warning: Transformation introduced infinite values in continuous y-axis

$P^2 = 2$, irrep = A1, $P = -101$



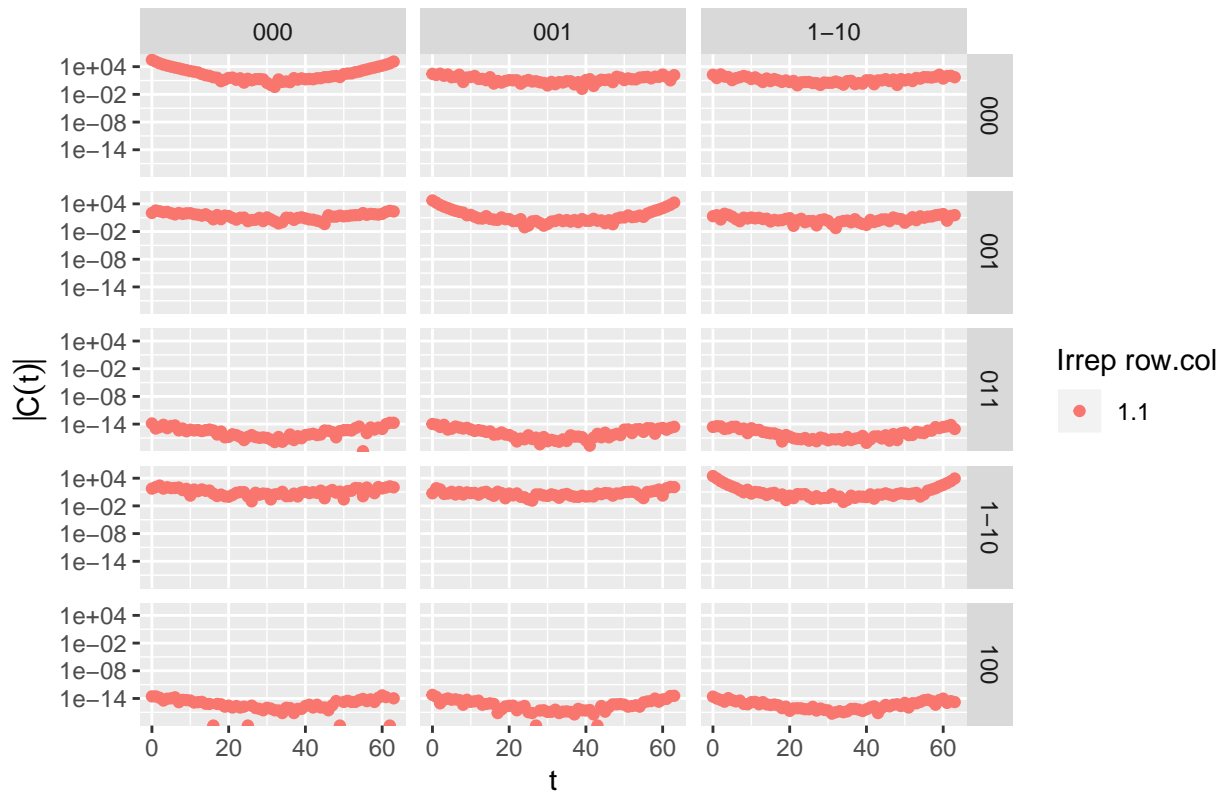
Warning: Transformation introduced infinite values in continuous y-axis

$P^2 = 2$, irrep = A1, $P = -110$



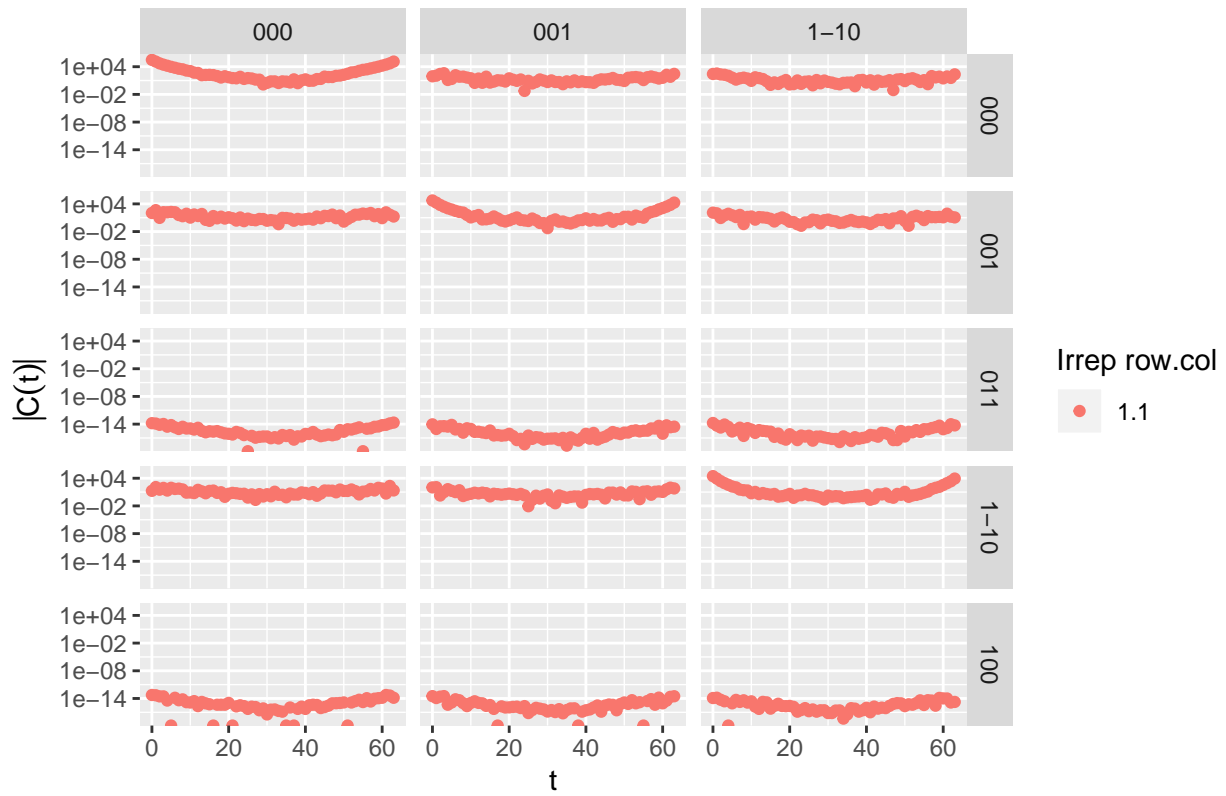
Warning: Transformation introduced infinite values in continuous y-axis

$P^2 = 2$, irrep = A1, P = 0-1-1



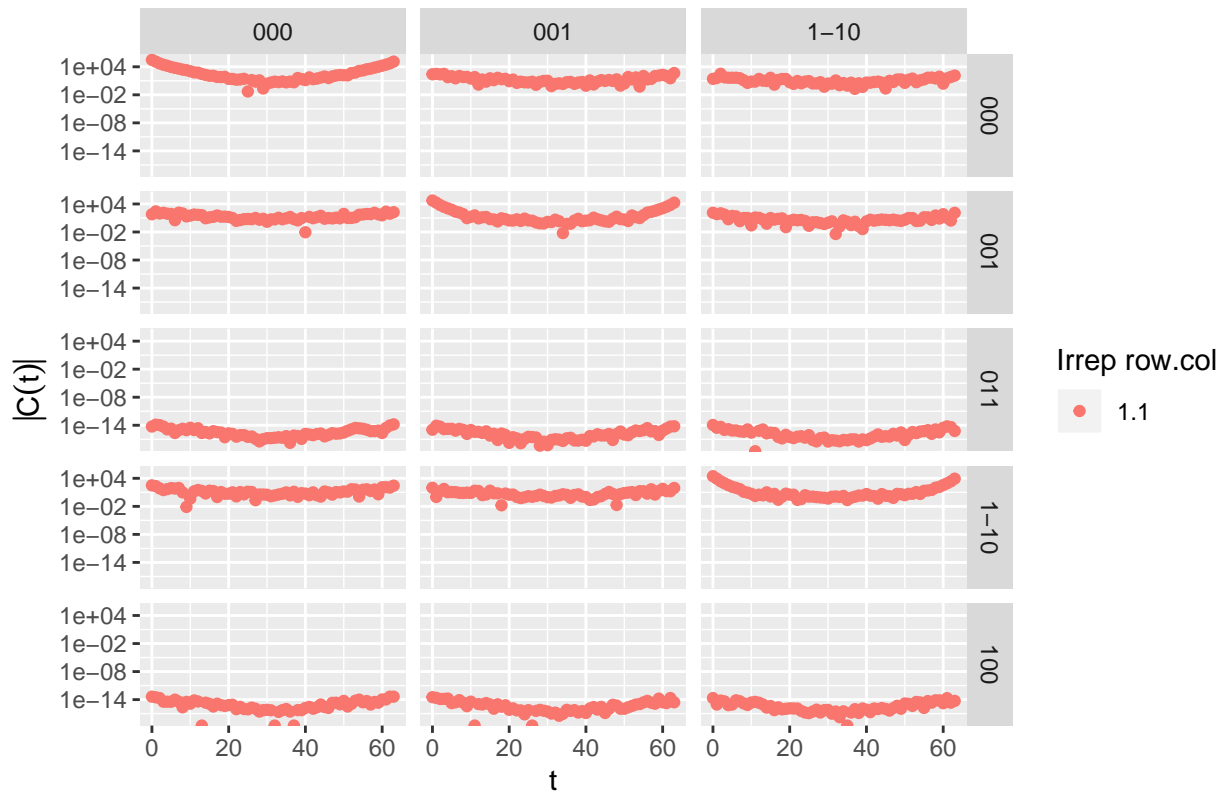
Warning: Transformation introduced infinite values in continuous y-axis

$P^2 = 2$, irrep = A1, P = 0-11



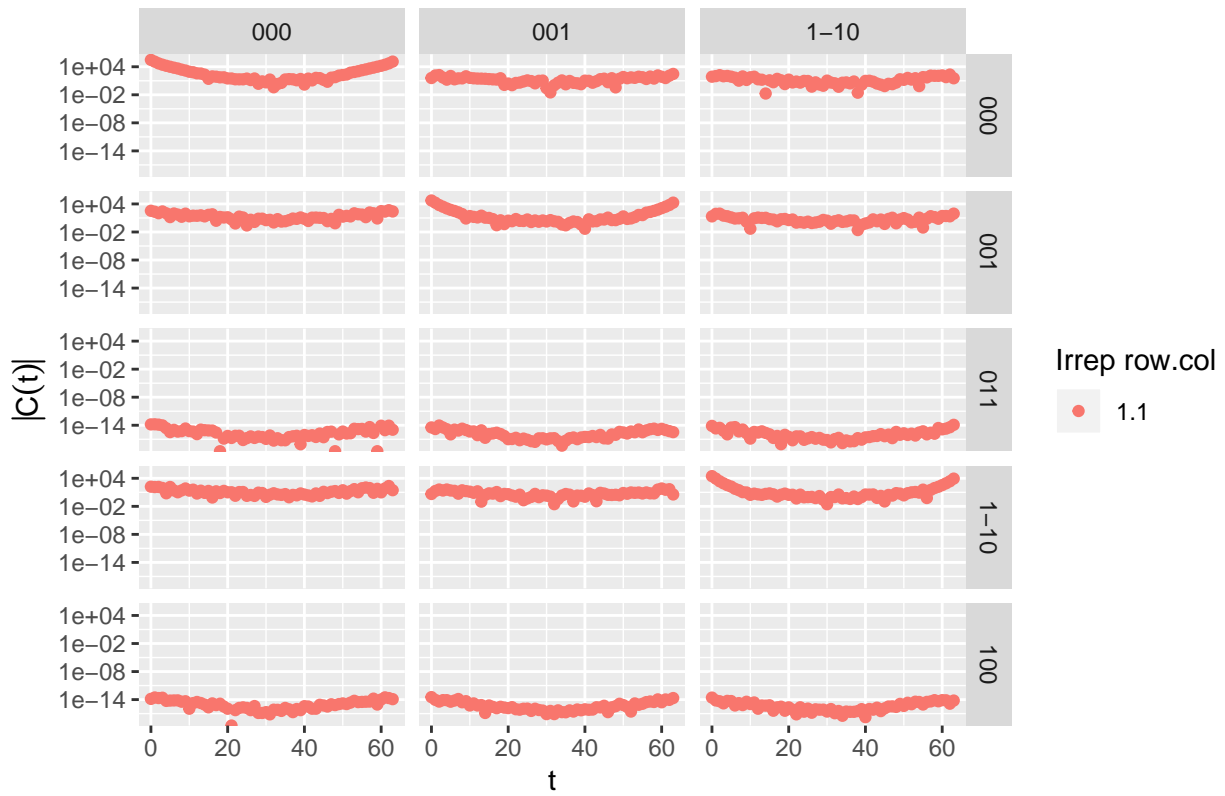
Warning: Transformation introduced infinite values in continuous y-axis

$P^2 = 2$, irrep = A1, $P = 01-1$



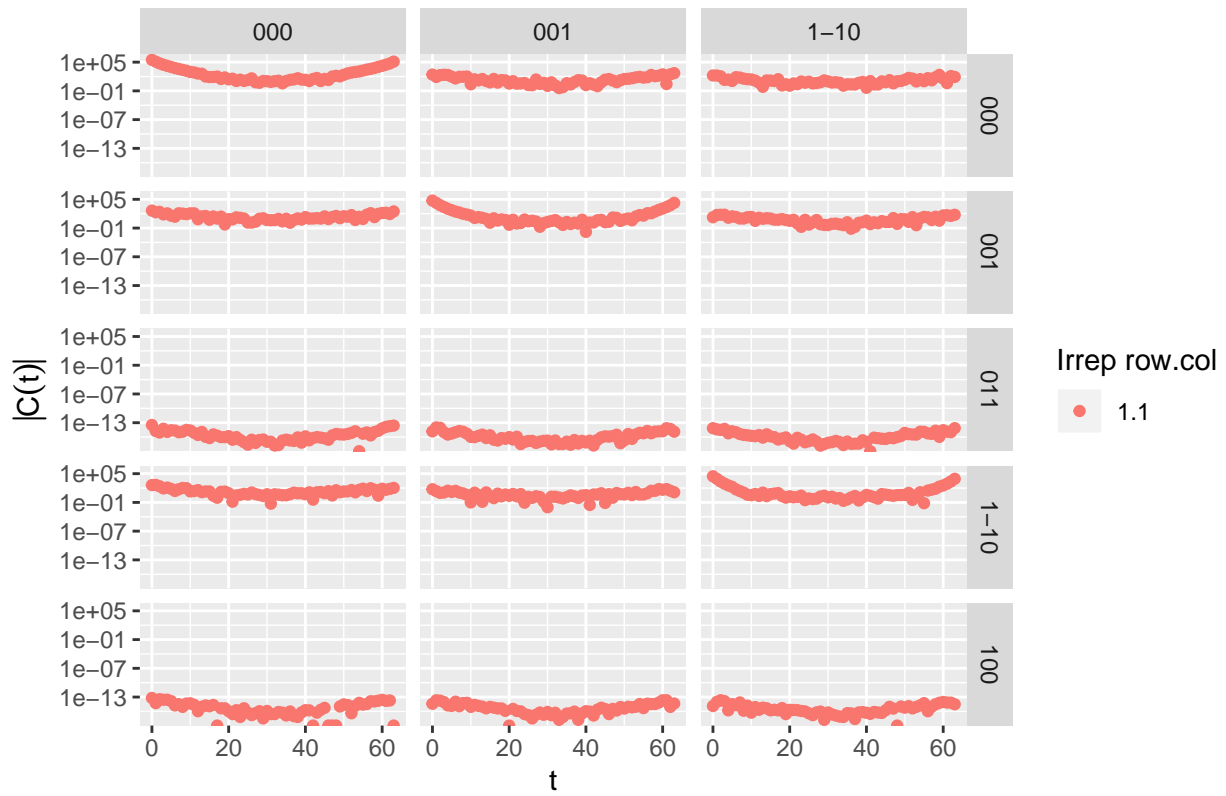
Warning: Transformation introduced infinite values in continuous y-axis

$P^2 = 2$, irrep = A1, P = 011



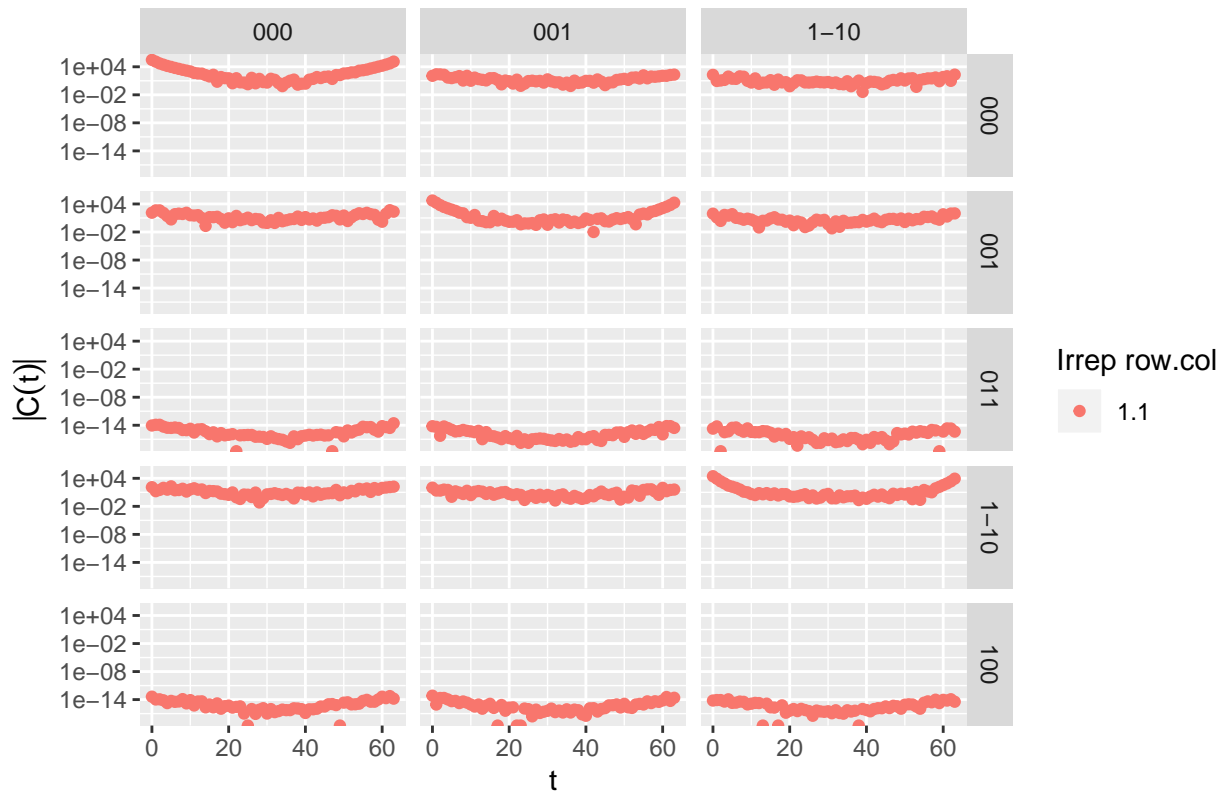
Warning: Transformation introduced infinite values in continuous y-axis

$P^2 = 2$, irrep = A1, P = 1-10



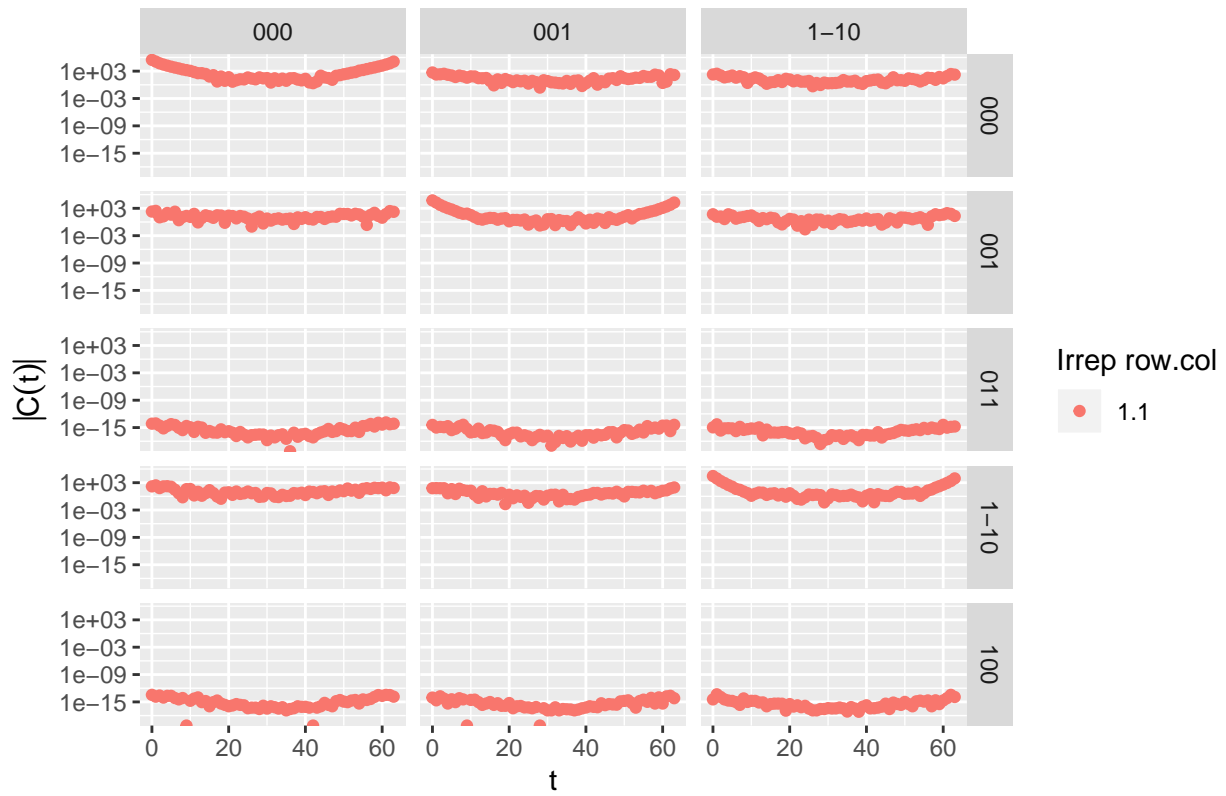
Warning: Transformation introduced infinite values in continuous y-axis

$P^2 = 2$, irrep = A1, $P = 10-1$



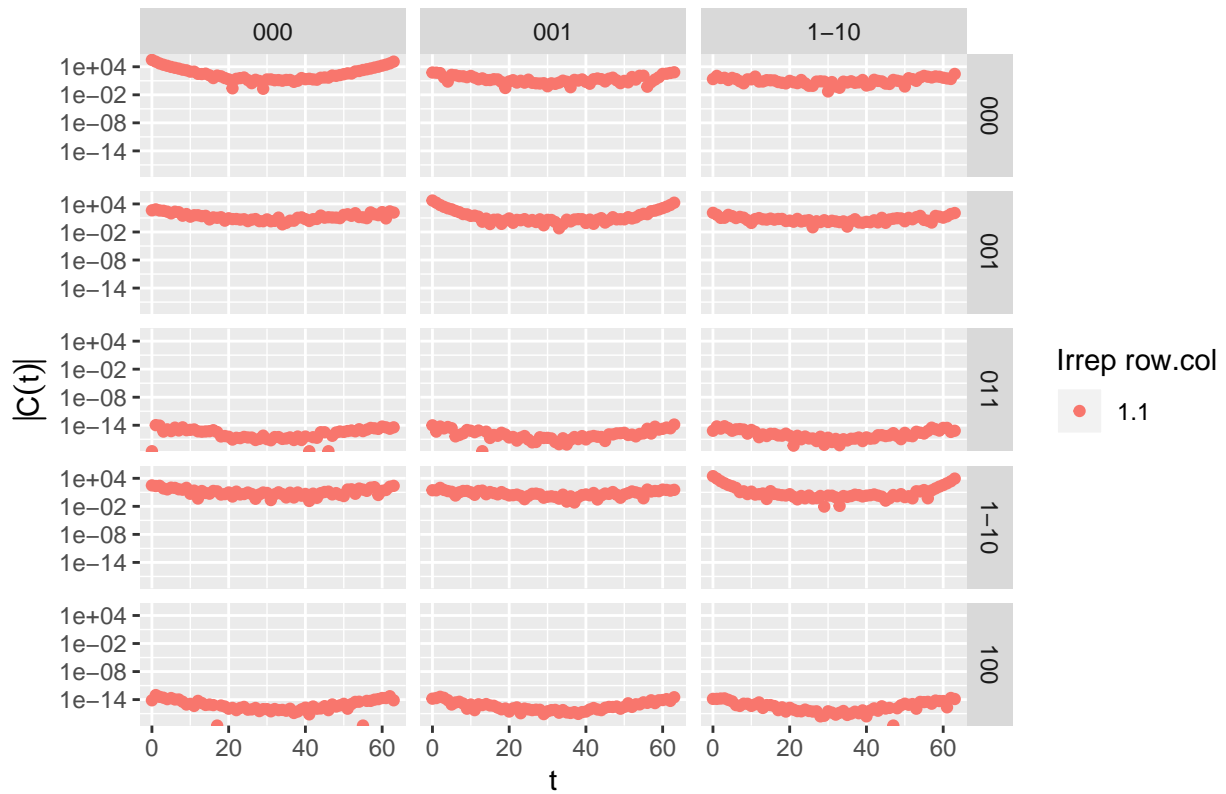
Warning: Transformation introduced infinite values in continuous y-axis

$P^2 = 2$, irrep = A1, $P = 101$

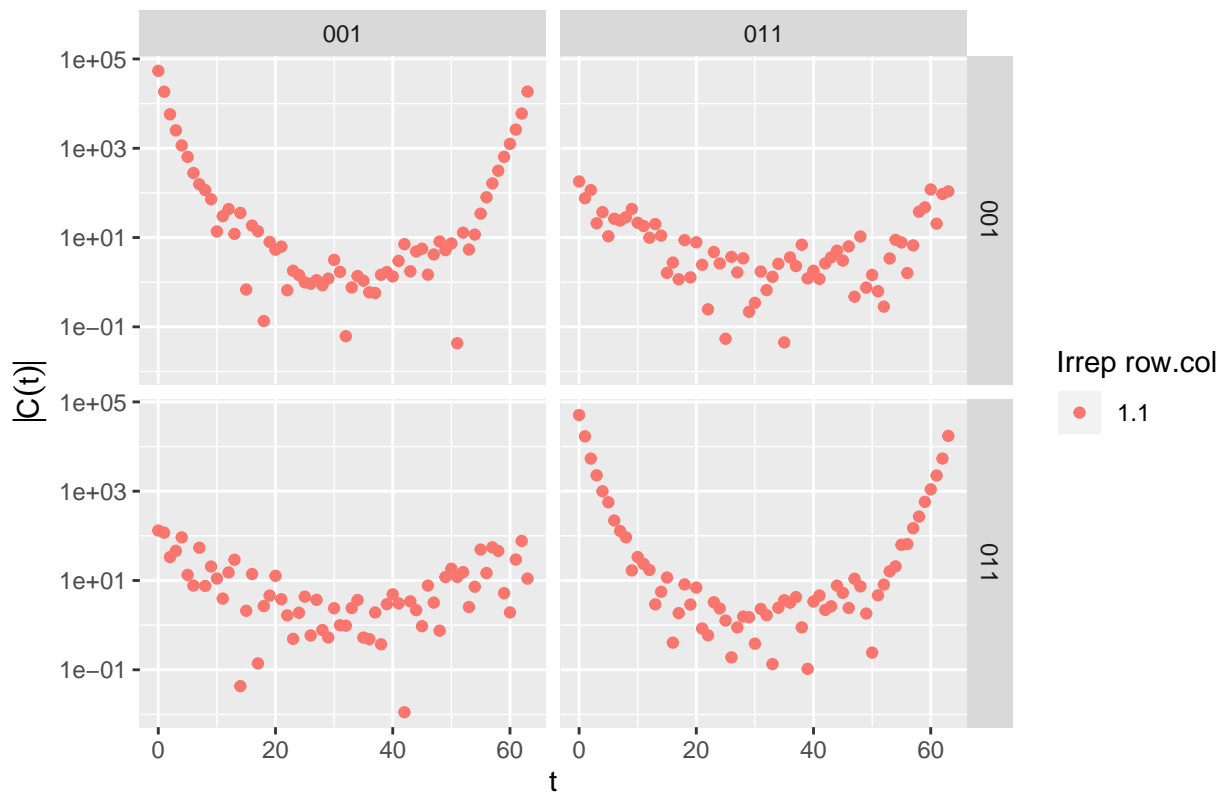


Warning: Transformation introduced infinite values in continuous y-axis

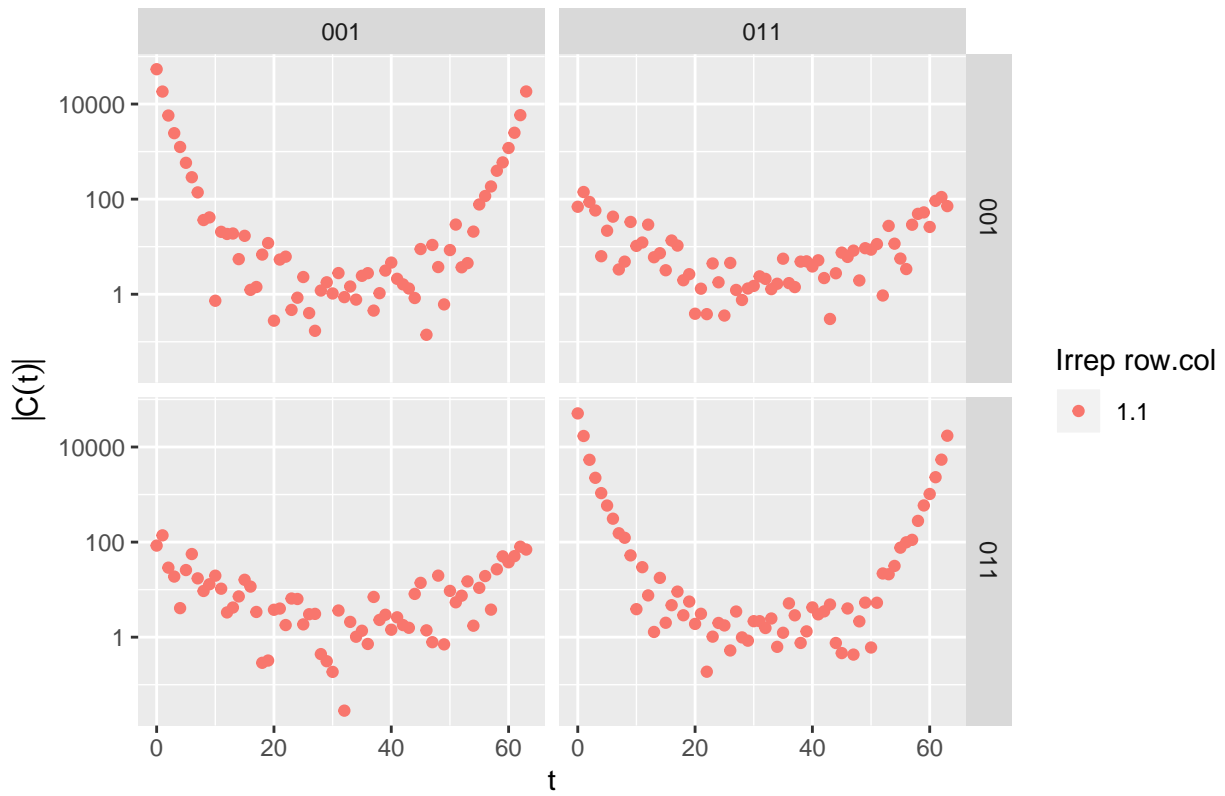
$P^2 = 2$, irrep = A1, $P = 110$



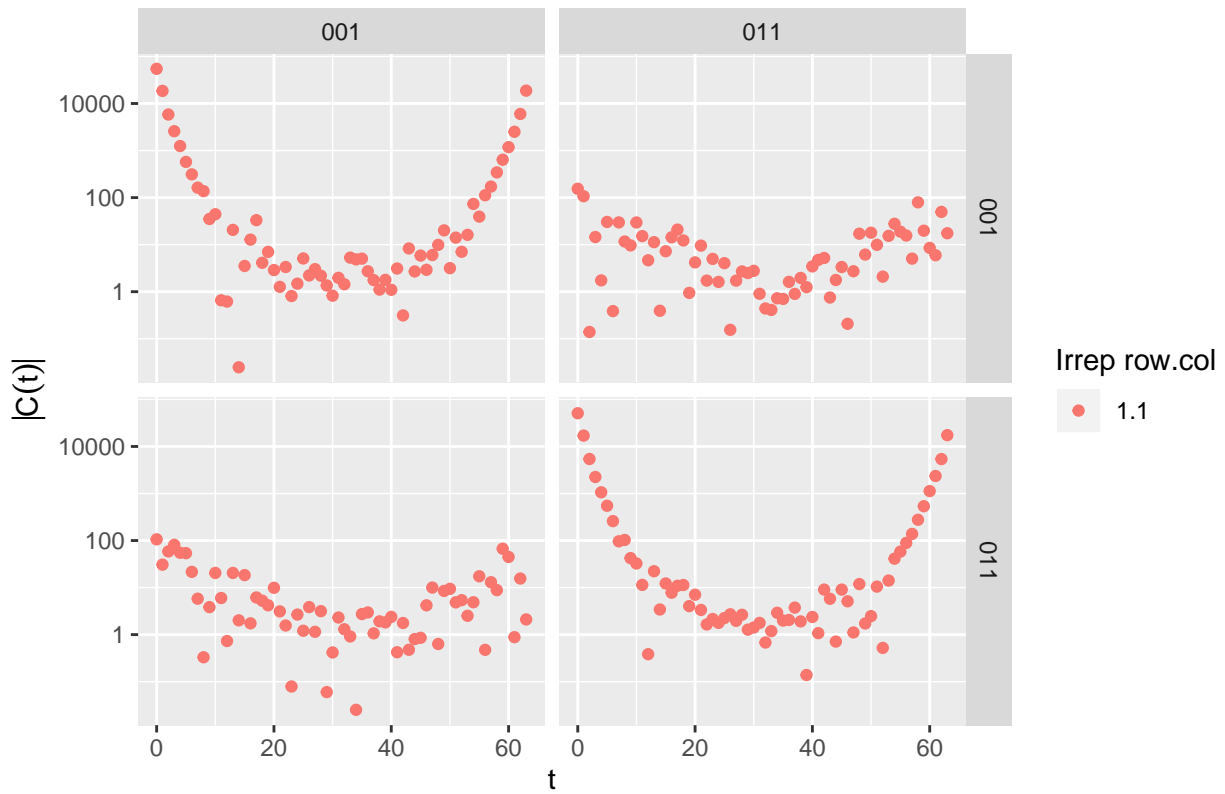
$P^2 = 2$, irrep = B1, $P = -1-10$



$P^2 = 2$, irrep = B1, $P = -110$



$P^2 = 2$, irrep = B1, $P = 0-1-1$



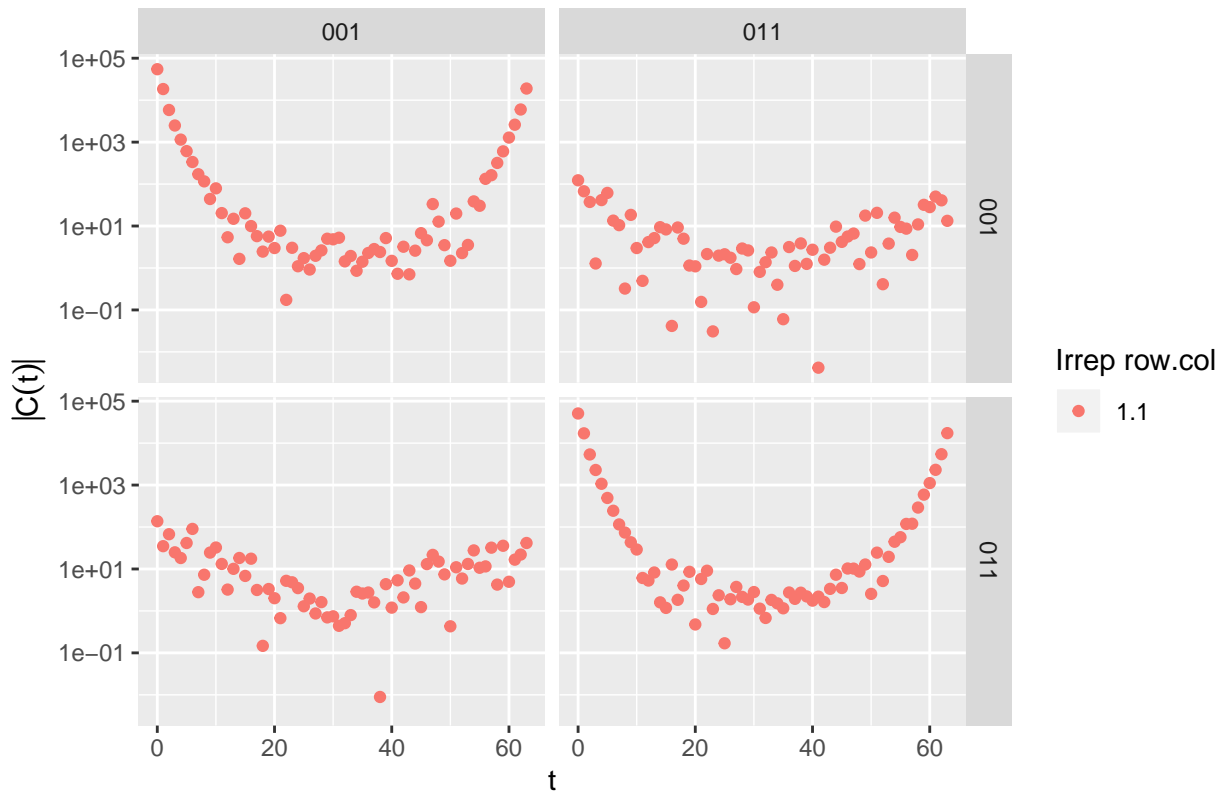
$P^2 = 2$, irrep = B1, P = 0–11



$P^2 = 2$, irrep = B1, P = 01–1



$P^2 = 2$, irrep = B1, $P = 011$



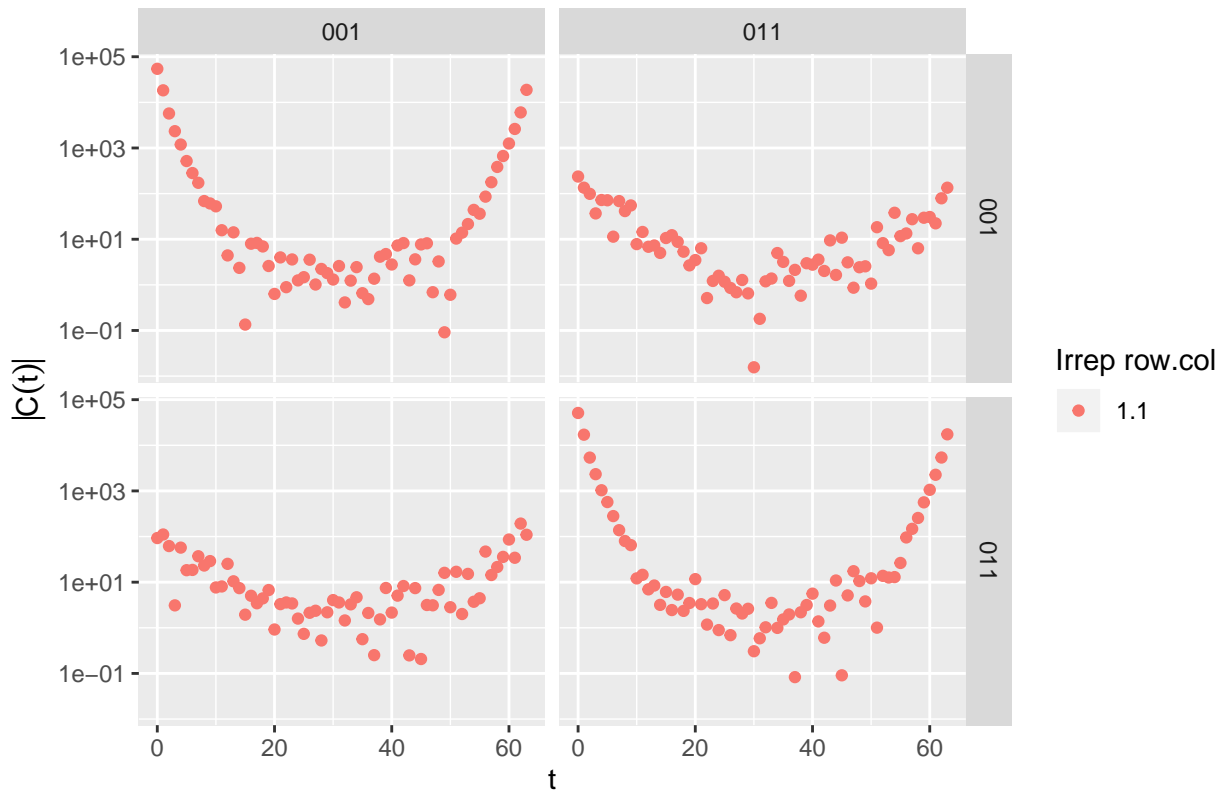
$P^2 = 2$, irrep = B1, $P = 1-10$



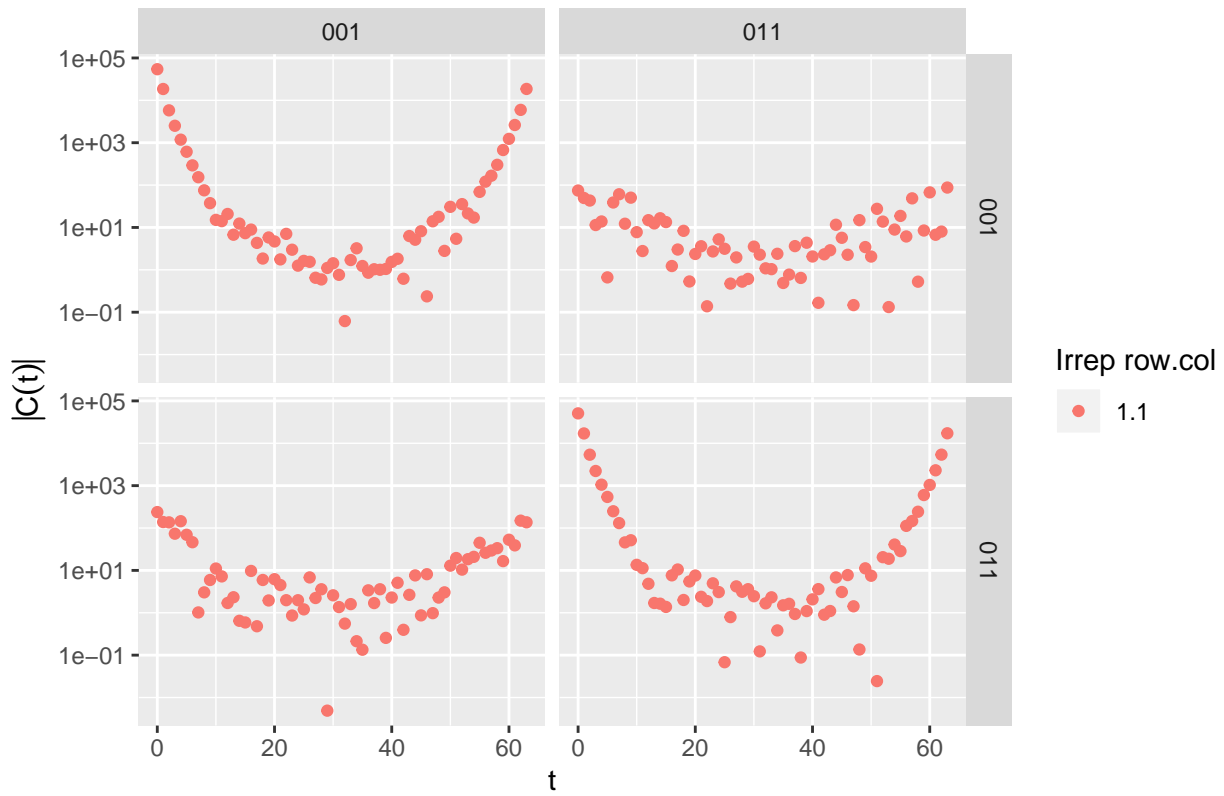
$P^2 = 2$, irrep = B1, $P = 10^{-1}$



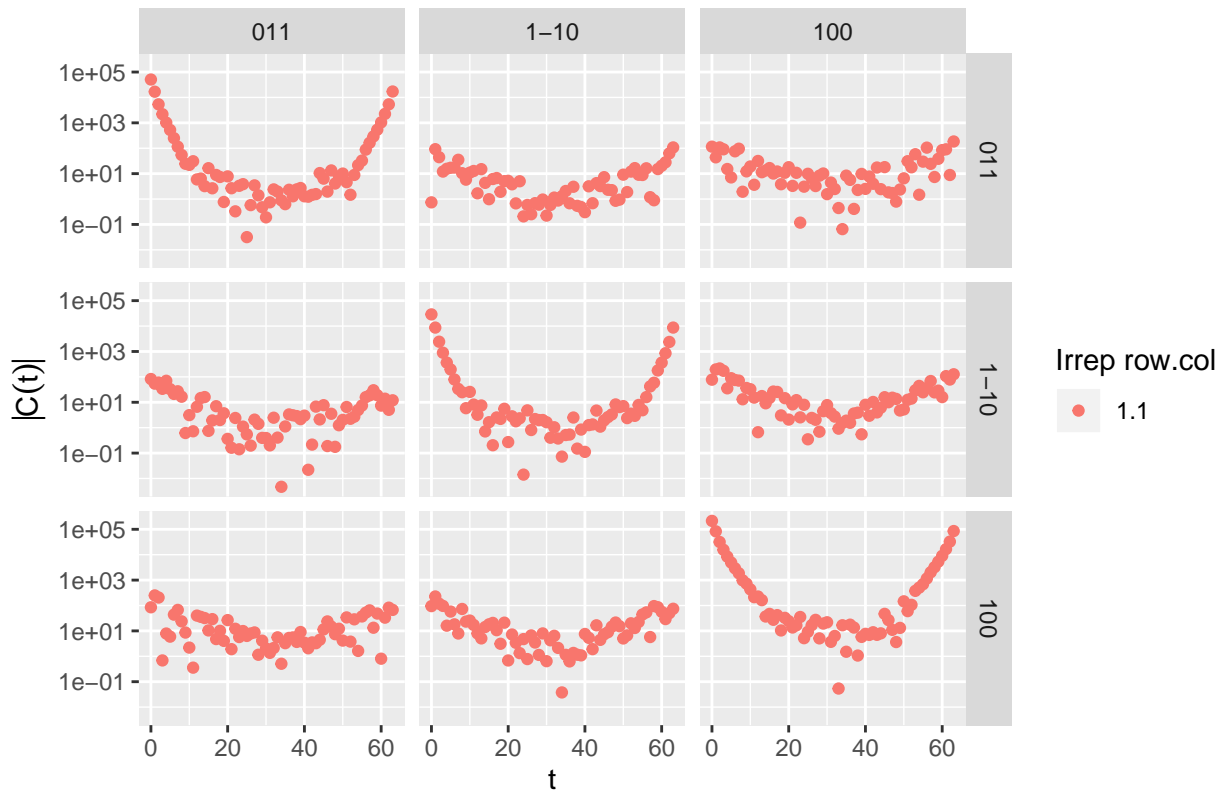
$P^2 = 2$, irrep = B1, $P = 10^1$



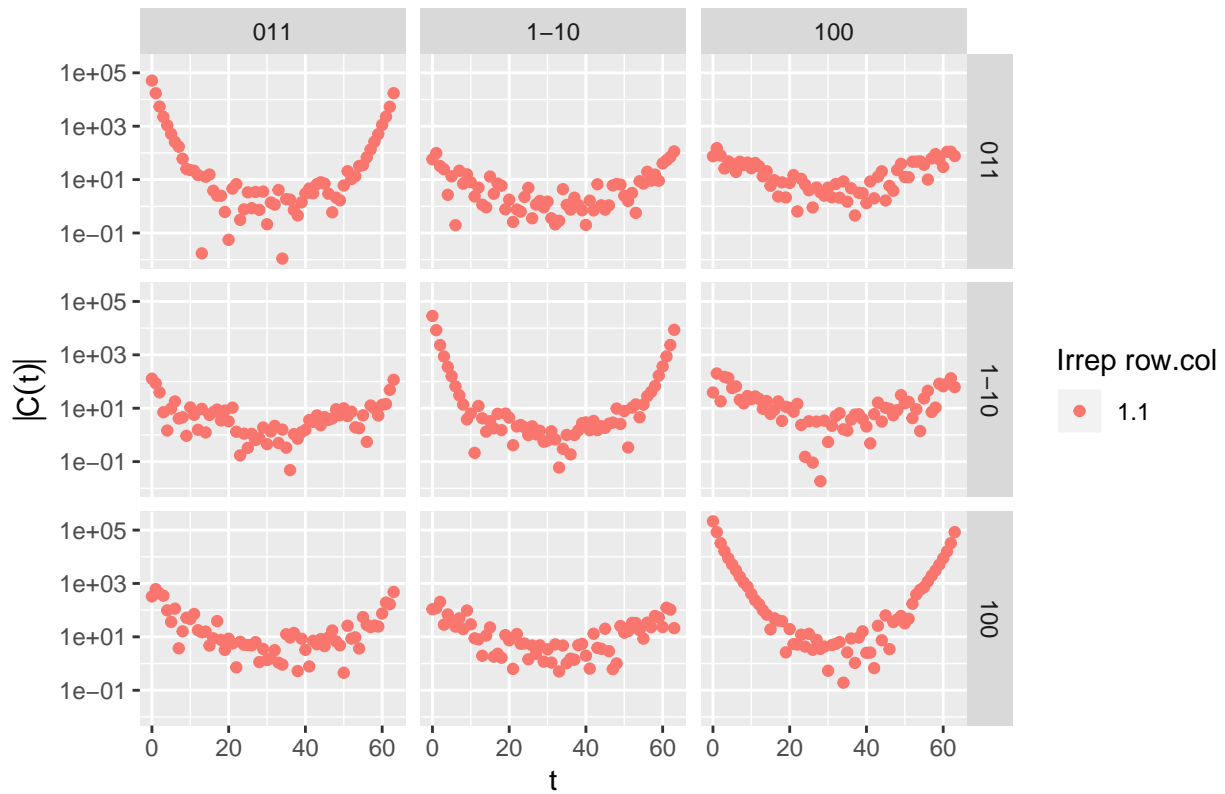
$P^2 = 2$, irrep = B1, $P = 110$



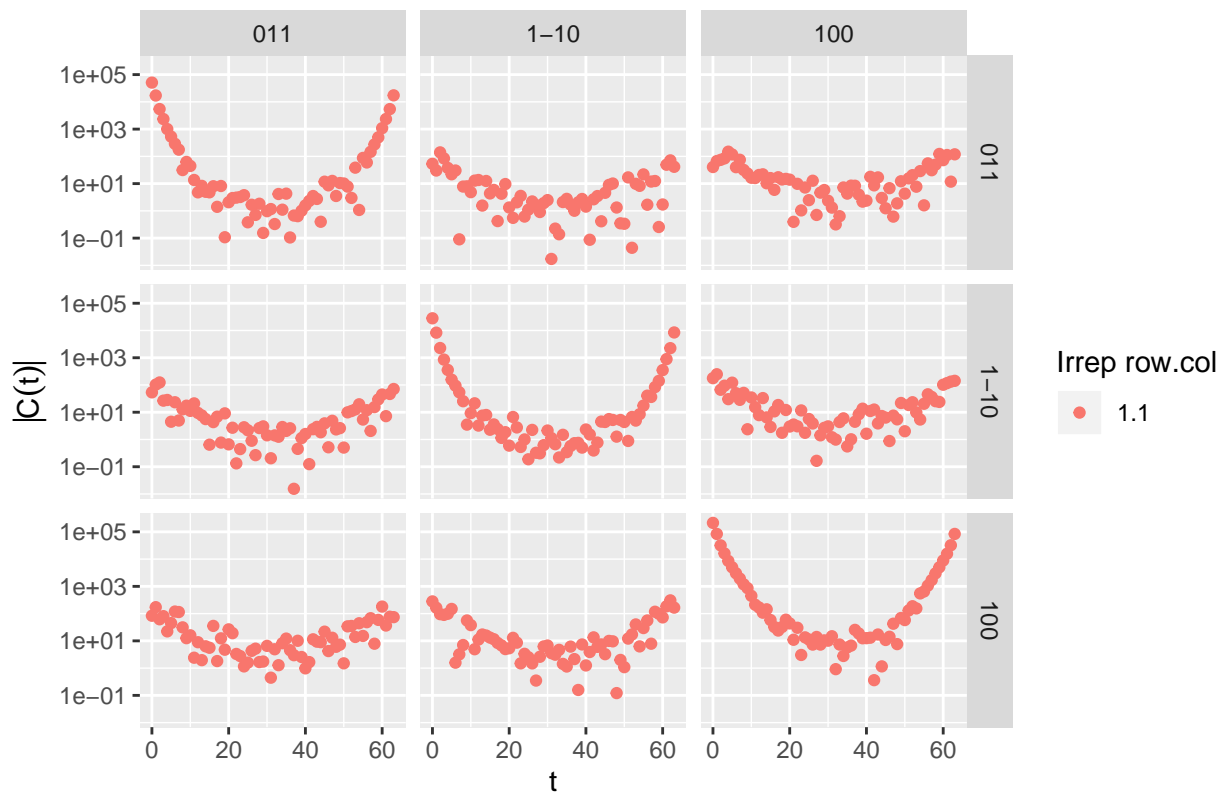
$P^2 = 2$, irrep = B2, $P = -1-10$



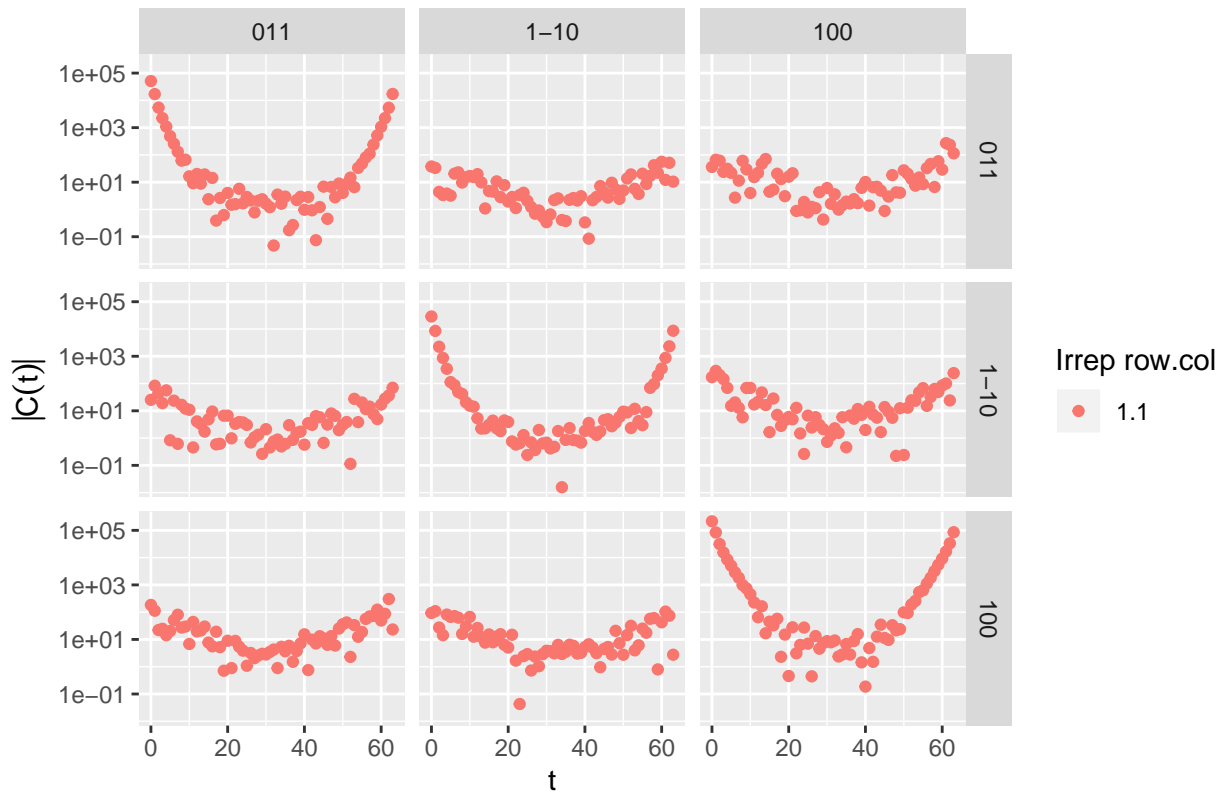
$P^2 = 2$, irrep = B2, $P = -10-1$



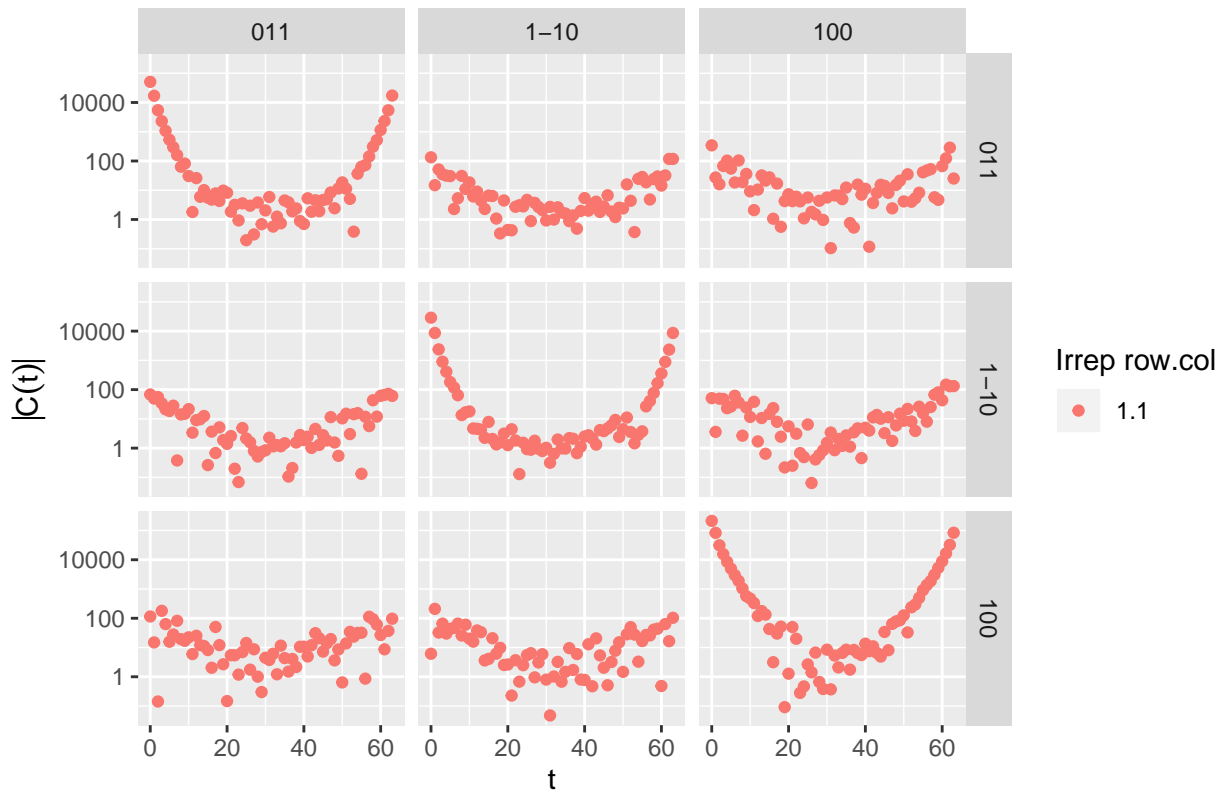
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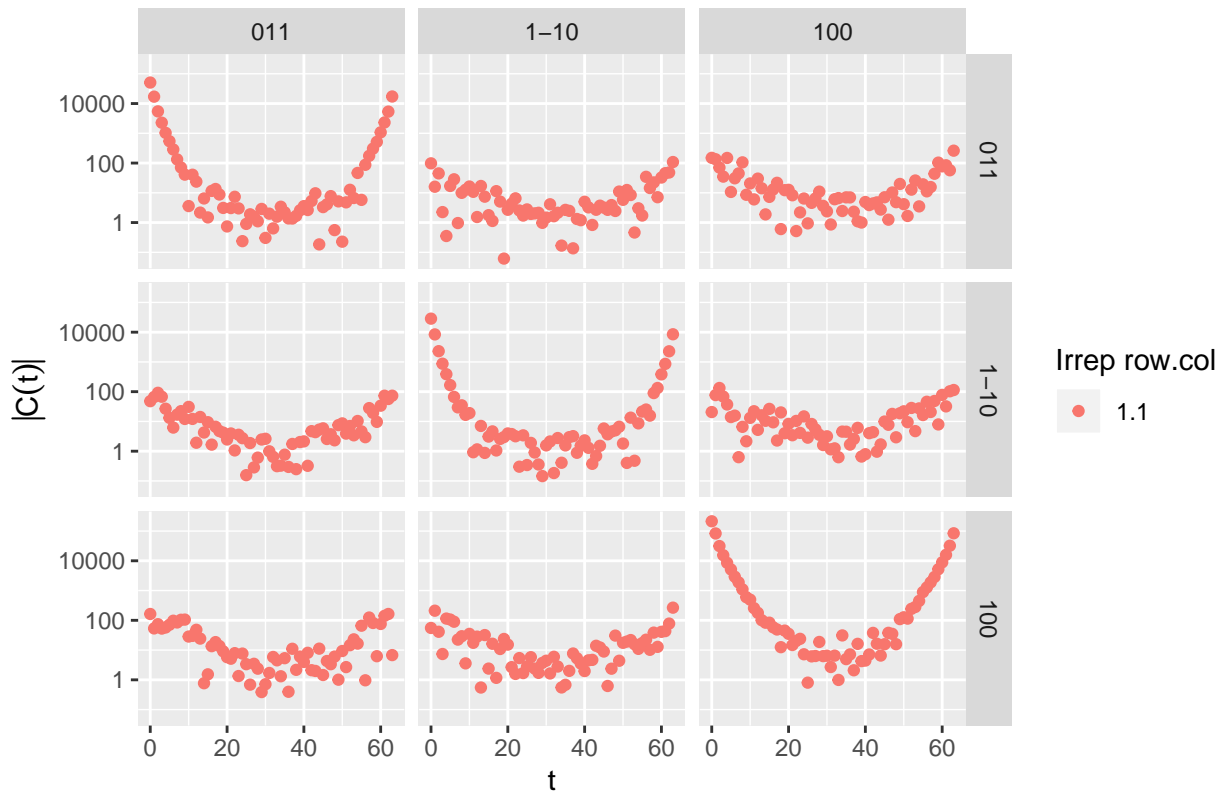
$P^2 = 2$, irrep = B2, $P = -110$



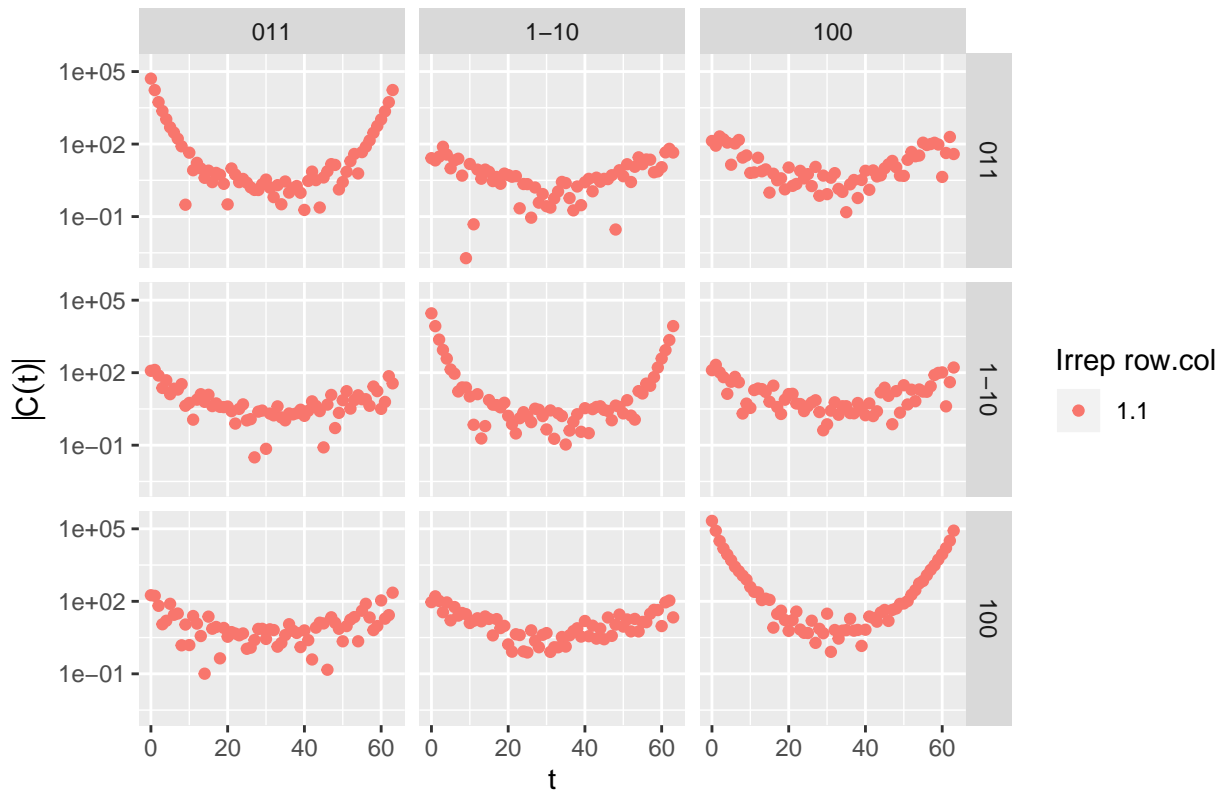
$P^2 = 2$, irrep = B2, $P = 0-1-1$



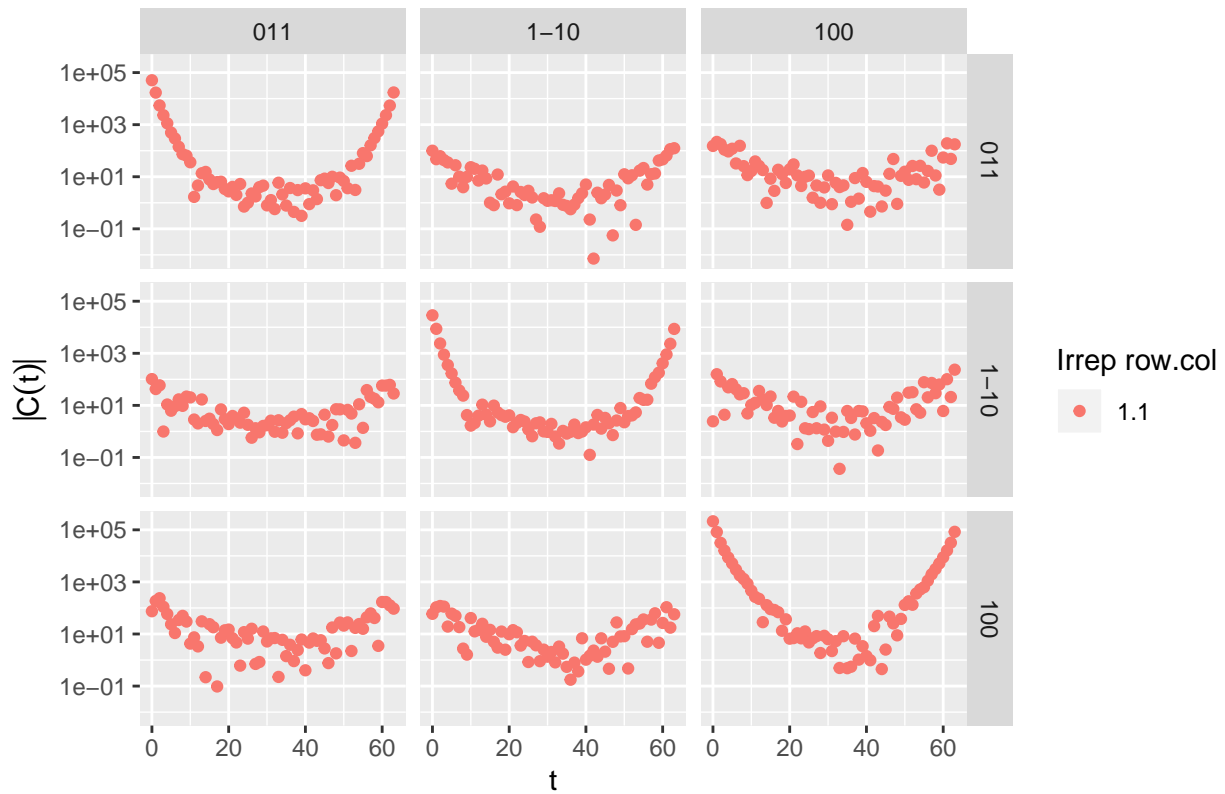
$P^2 = 2$, irrep = B2, P = 0-11



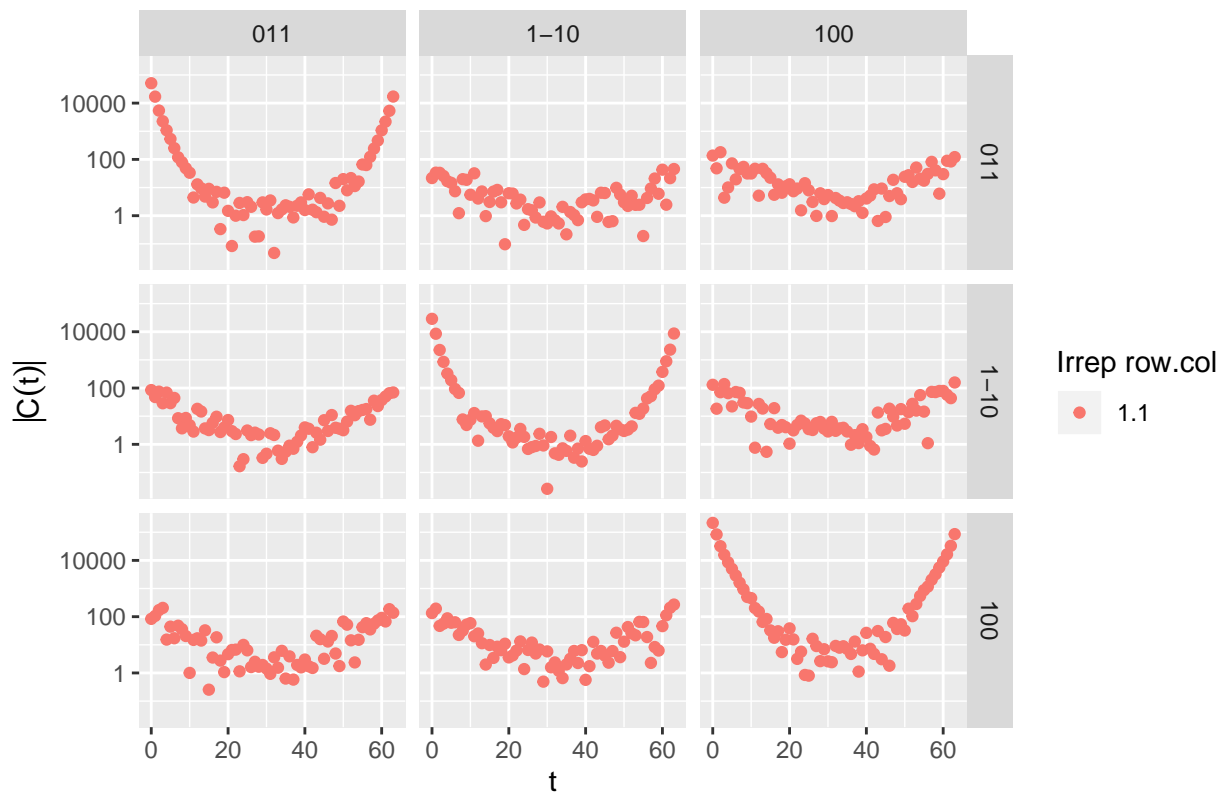
$P^2 = 2$, irrep = B2, P = 01-1



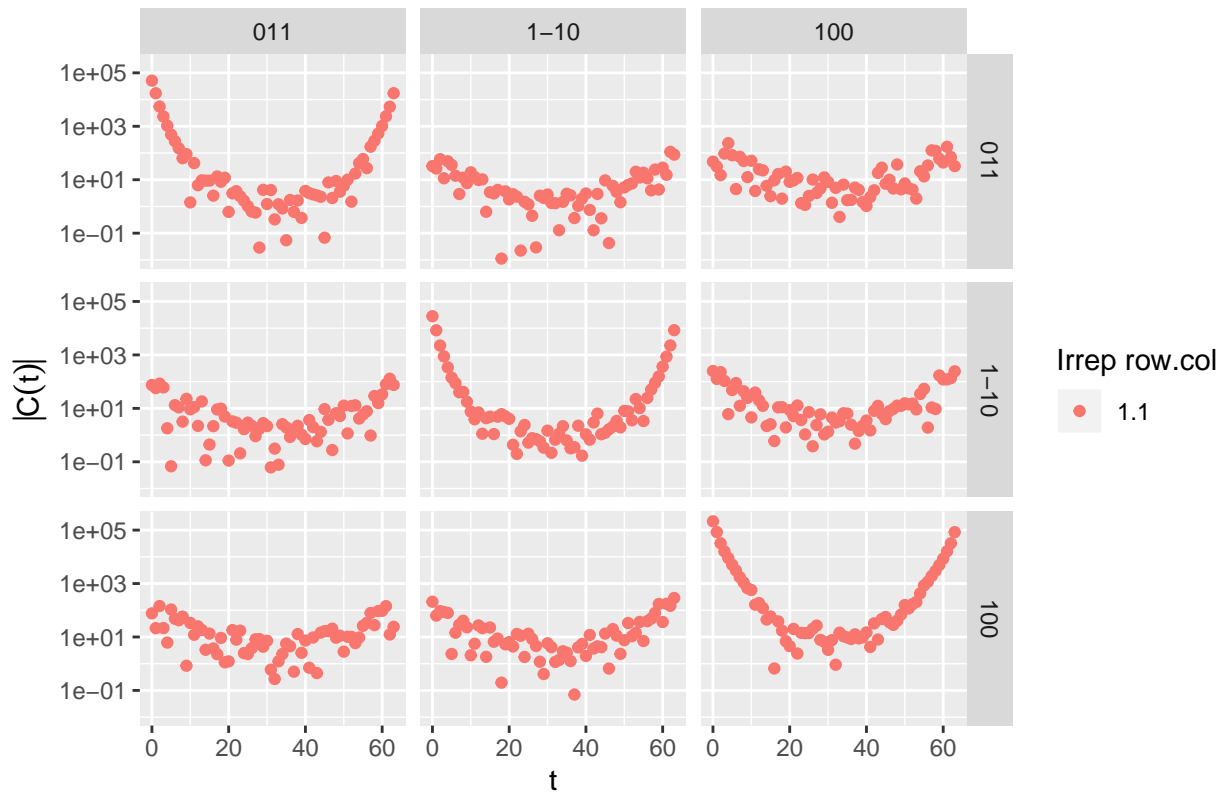
$P^2 = 2$, irrep = B2, $P = 011$



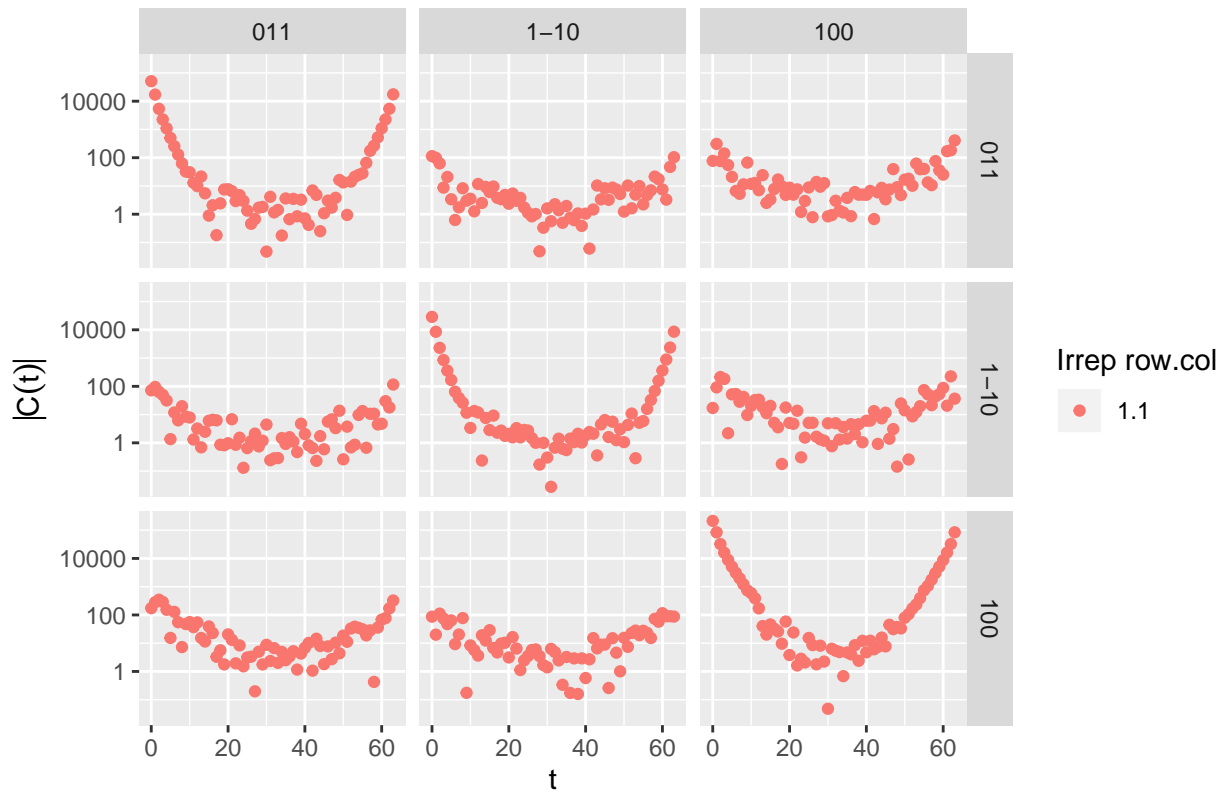
$P^2 = 2$, irrep = B2, $P = 1-10$



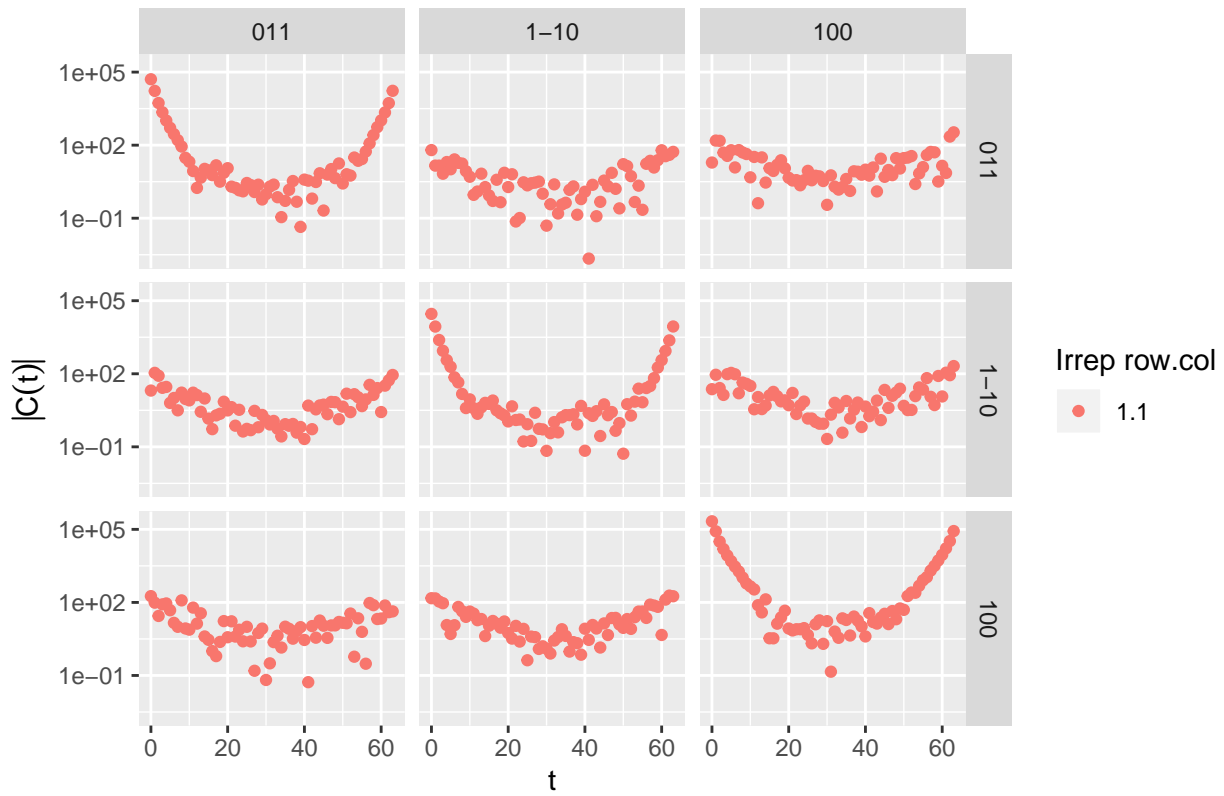
$P^2 = 2$, irrep = B2, $P = 10^{-1}$



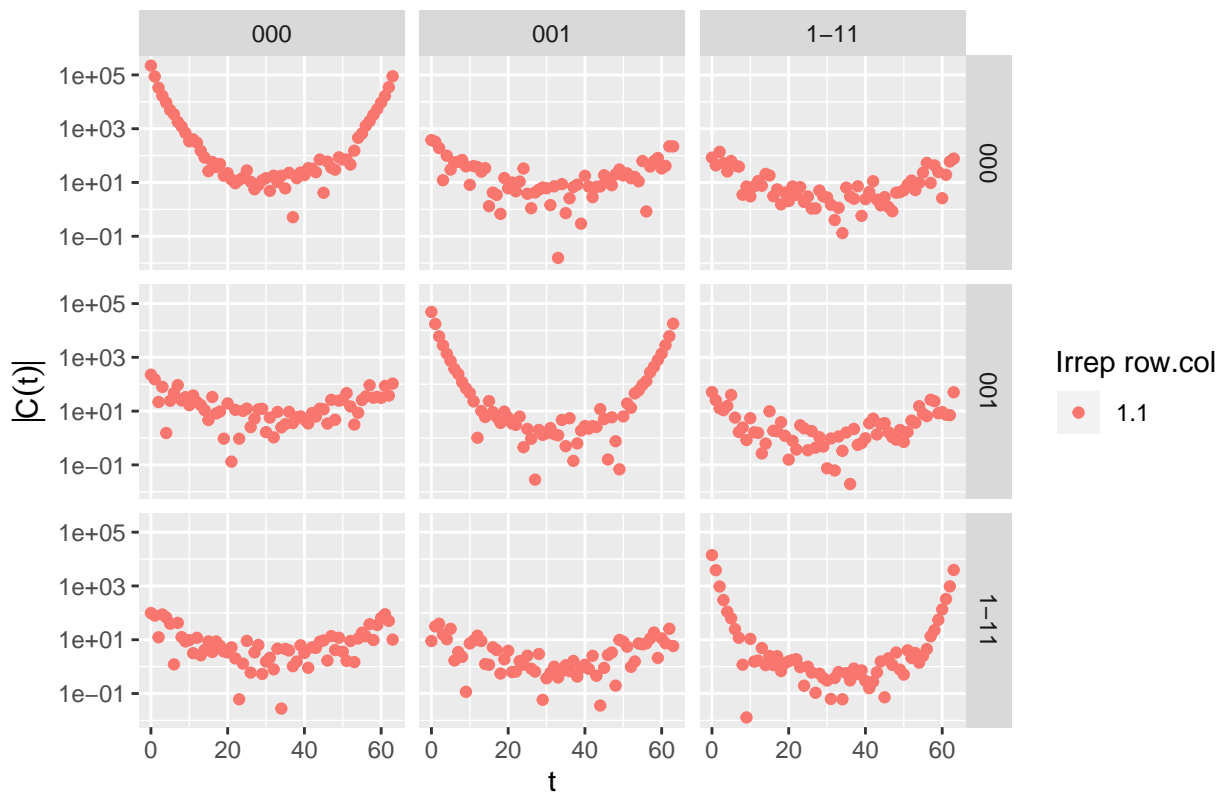
$P^2 = 2$, irrep = B2, $P = 10^1$



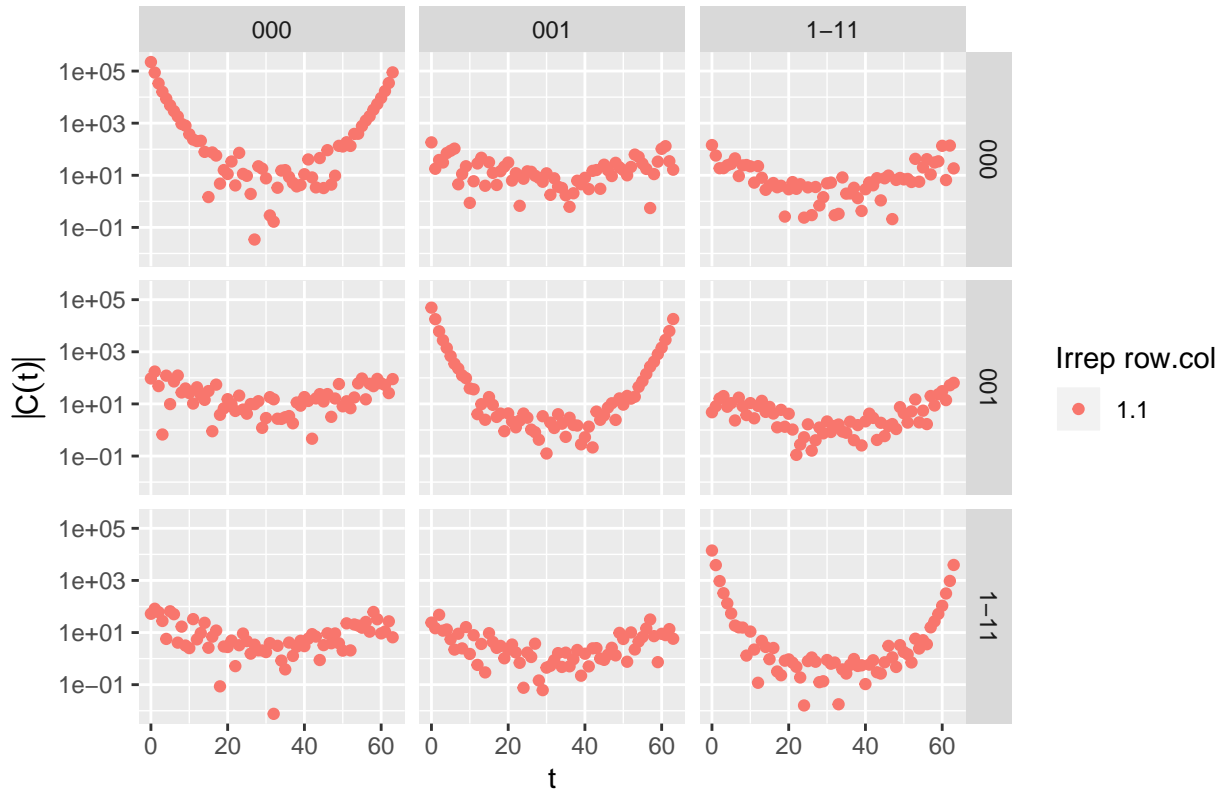
$P^2 = 2$, irrep = B2, $P = 110$



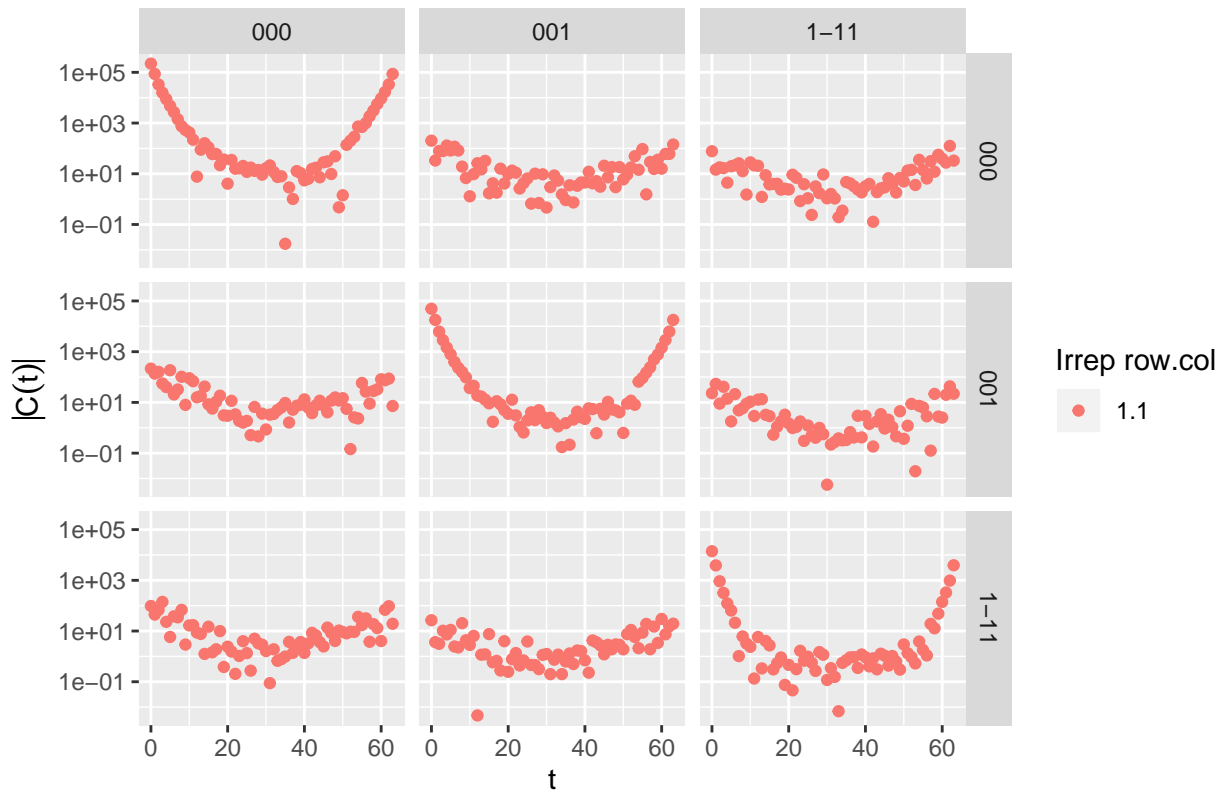
$P^2 = 3$, irrep = A1, $P = -1-1-1$



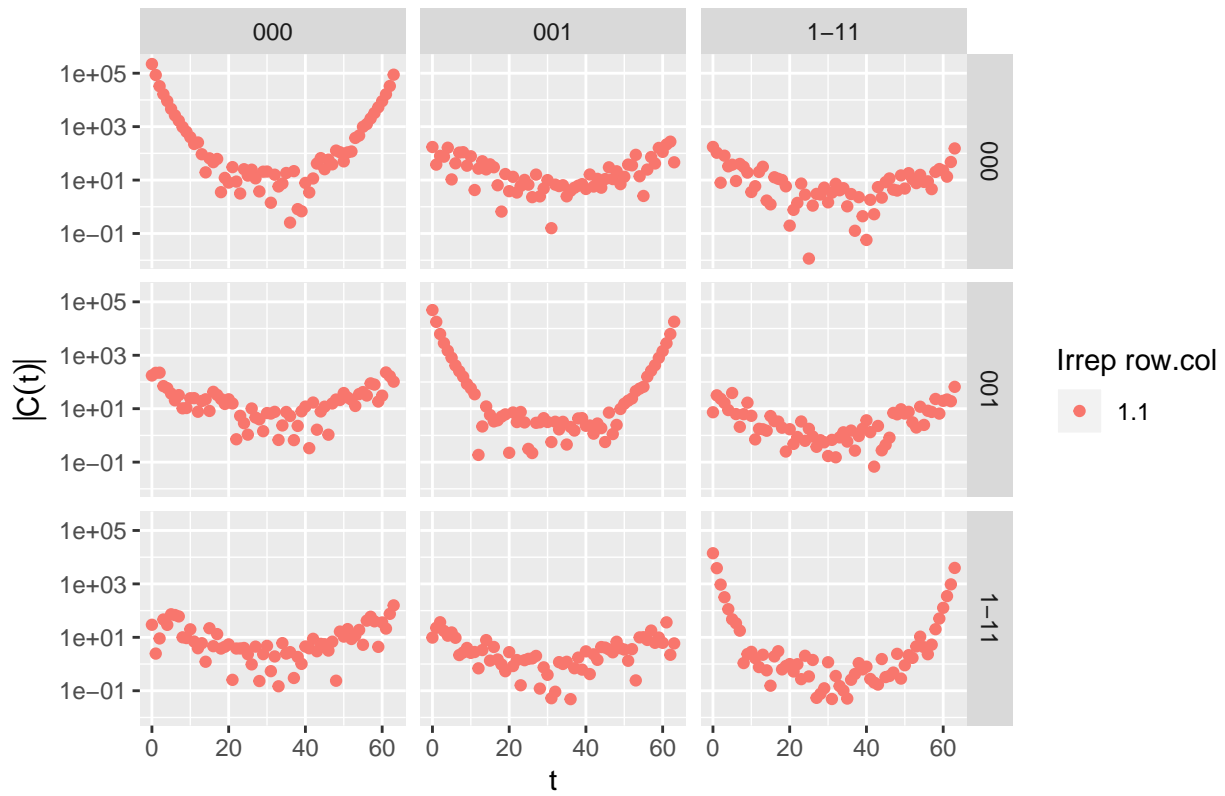
$P^2 = 3$, irrep = A1, $P = -1-11$



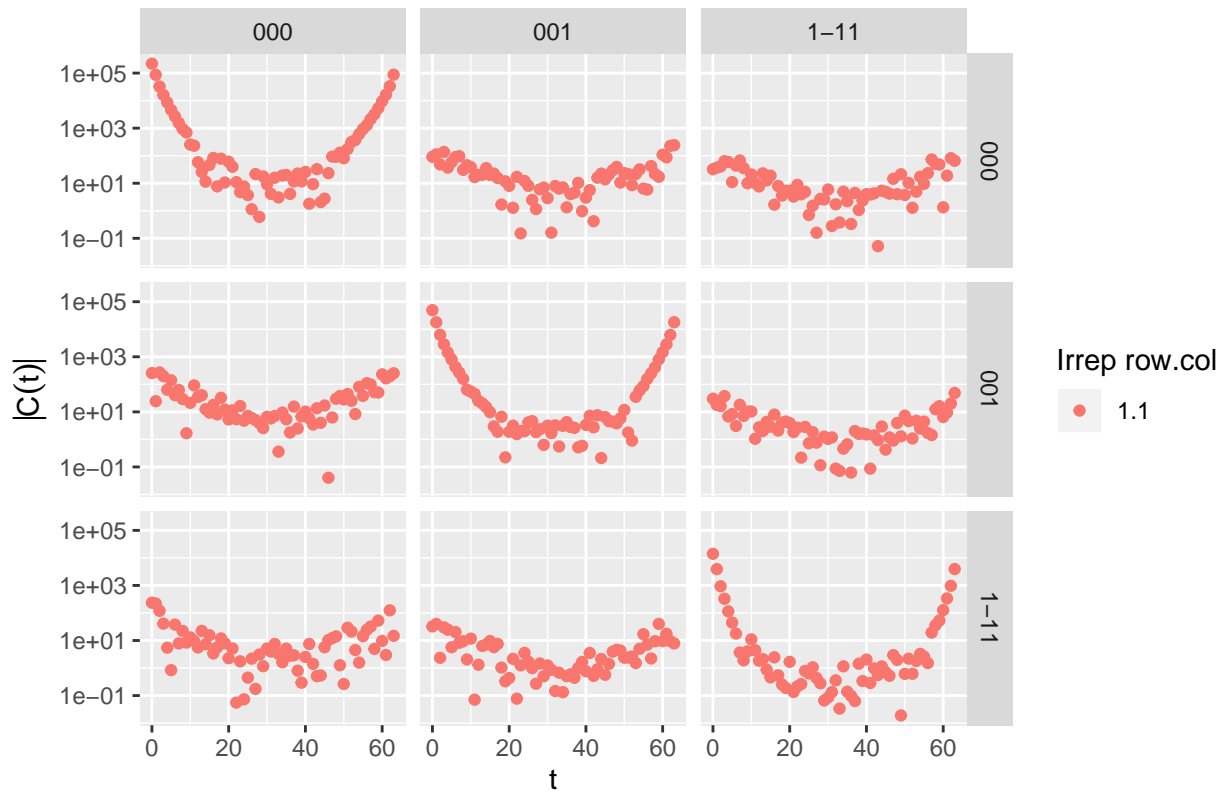
$P^2 = 3$, irrep = A1, $P = -11-1$



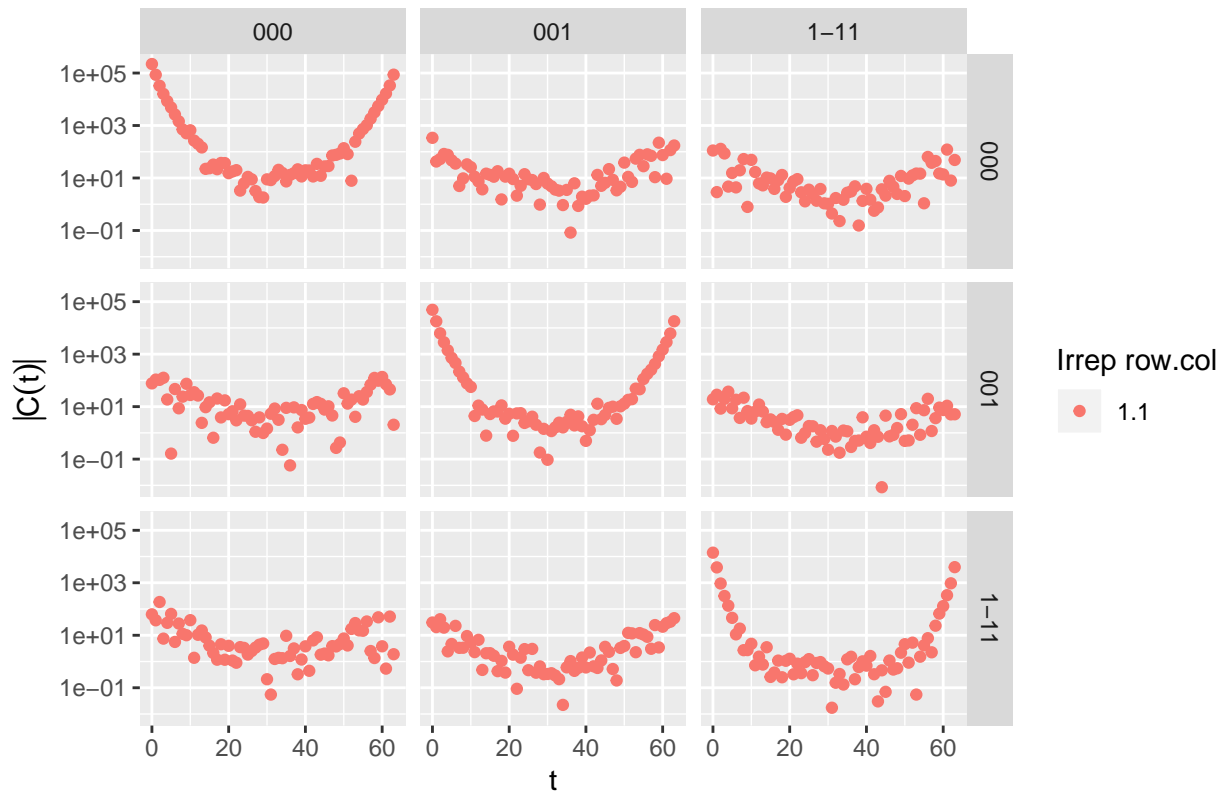
$P^2 = 3$, irrep = A1, $P = -111$



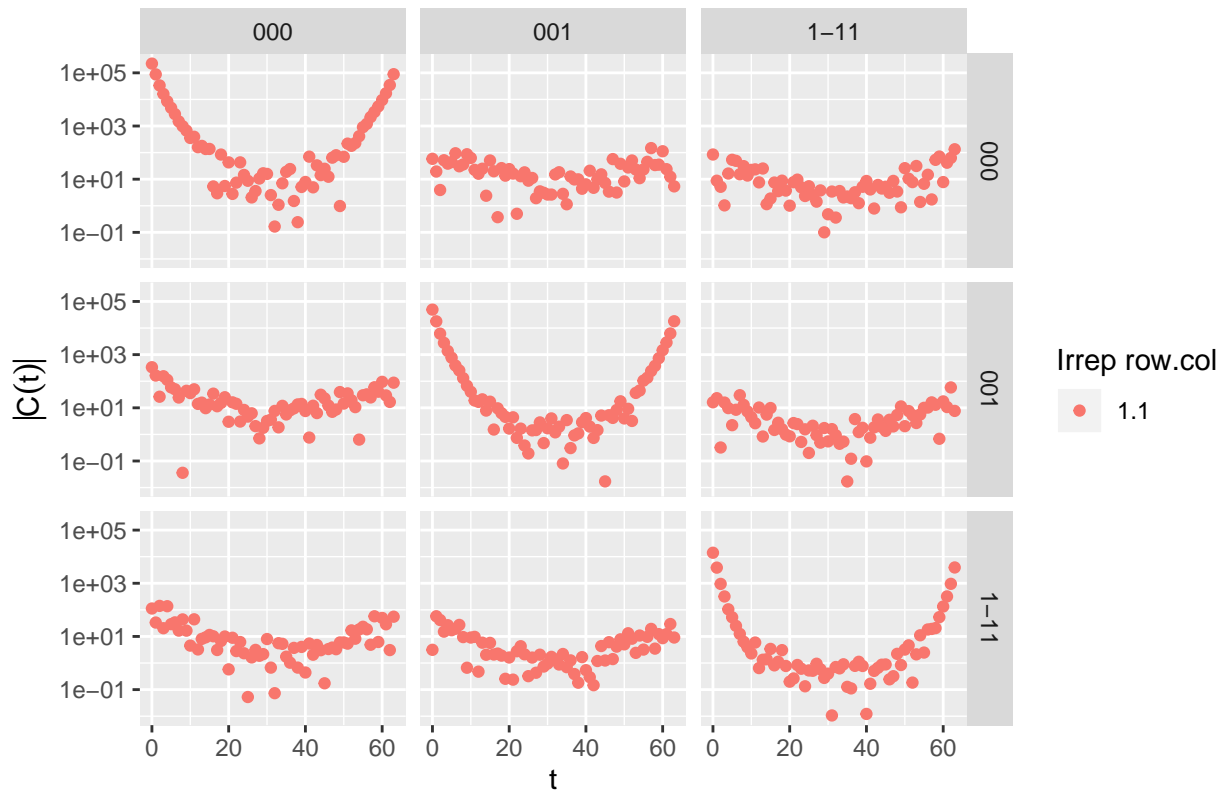
$P^2 = 3$, irrep = A1, $P = 1-1-1$



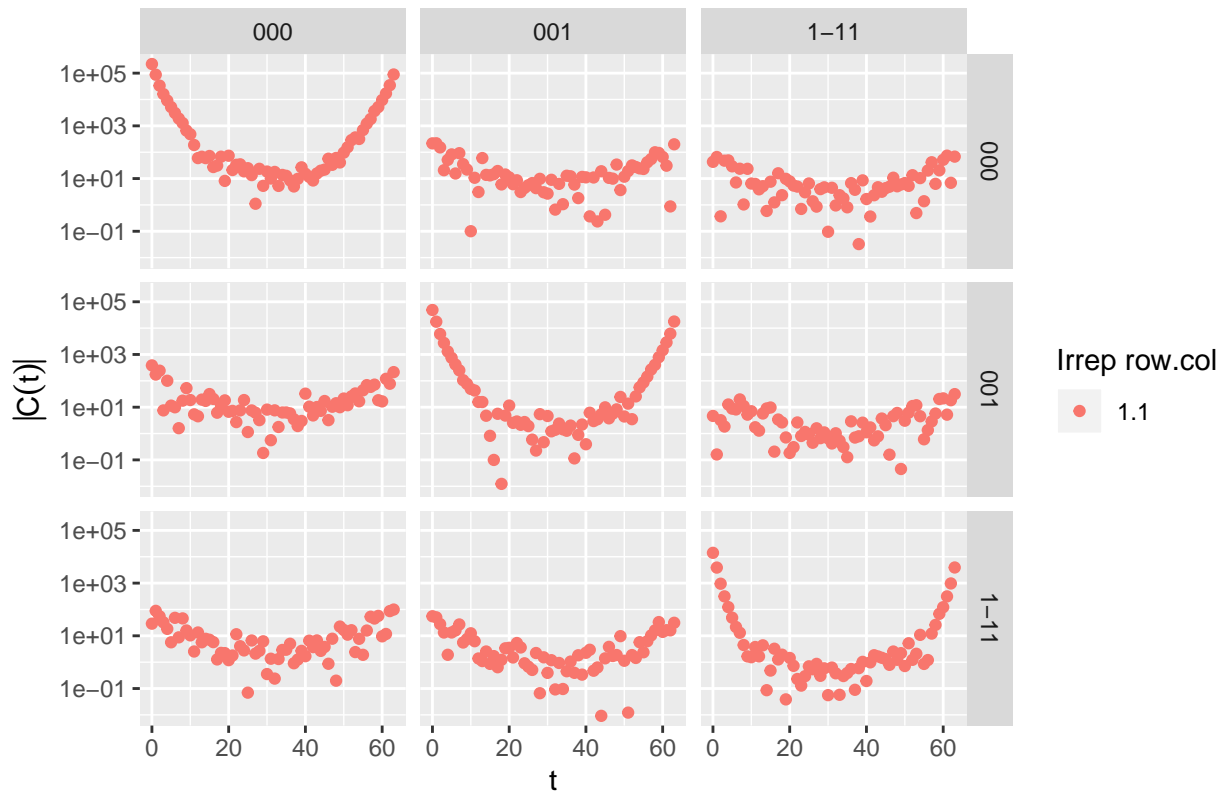
$P^2 = 3$, irrep = A1, $P = 1-11$



$P^2 = 3$, irrep = A1, $P = 11-1$

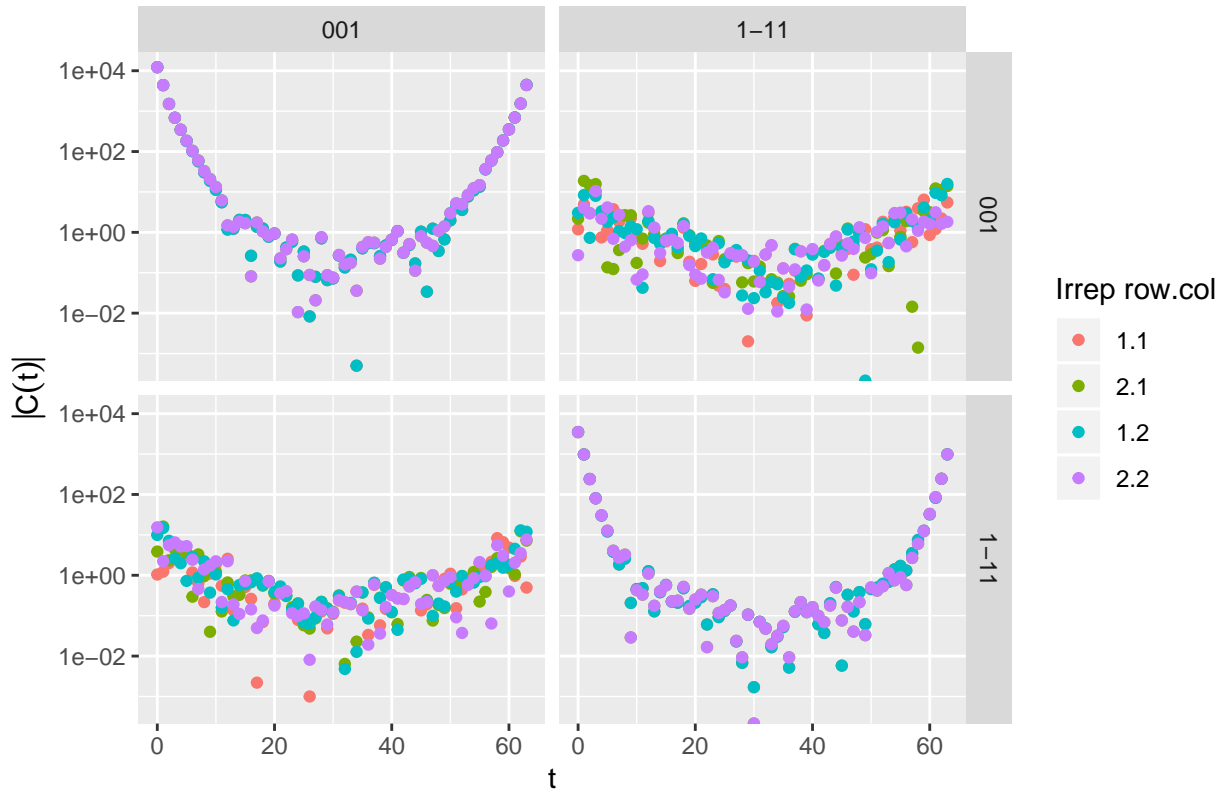


$P^2 = 3$, irrep = A1, $P = 111$

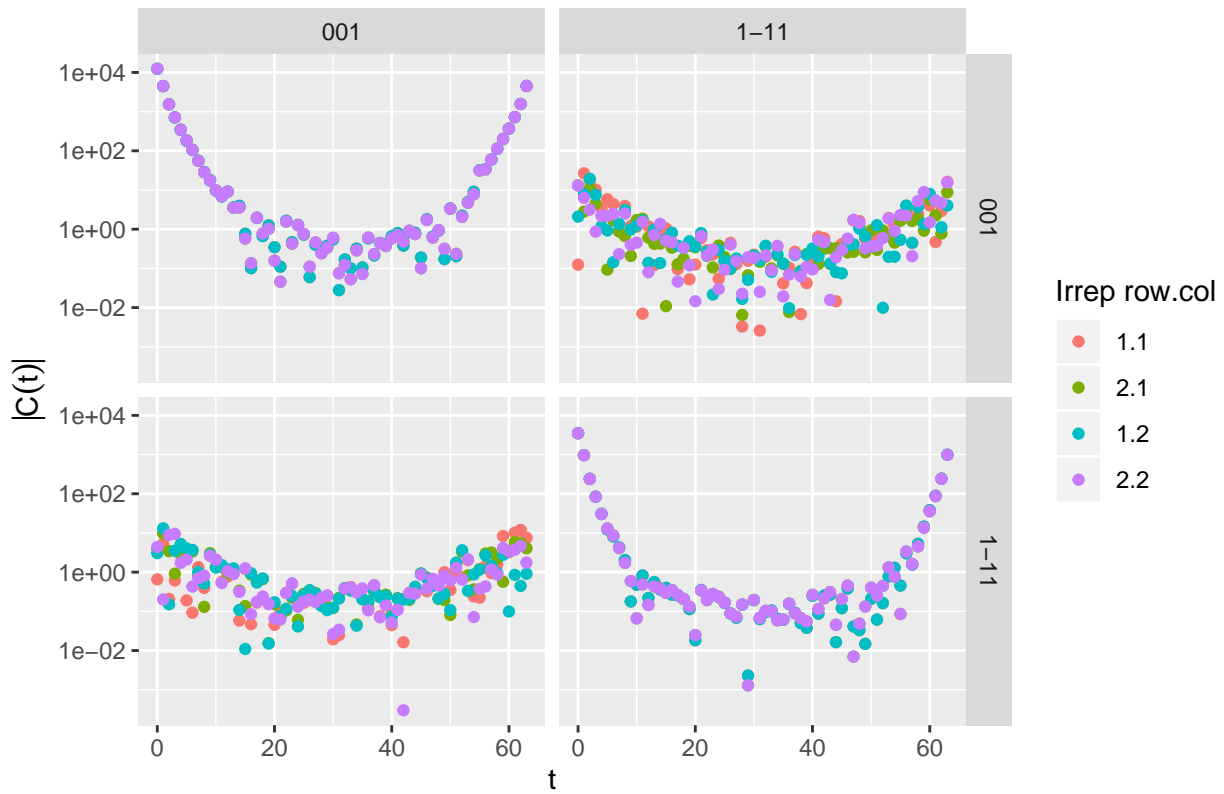


Warning: Transformation introduced infinite values in continuous y-axis

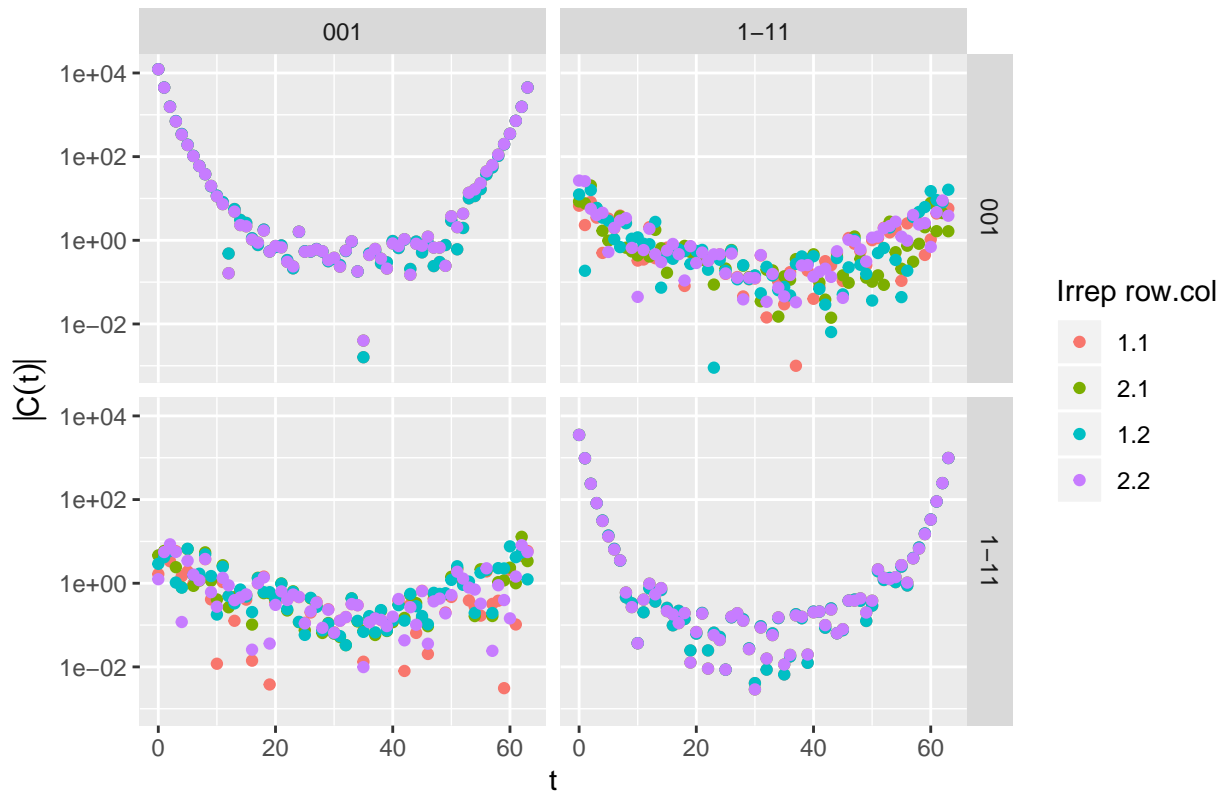
$P^2 = 3$, irrep = E, $P = -1-1-1$



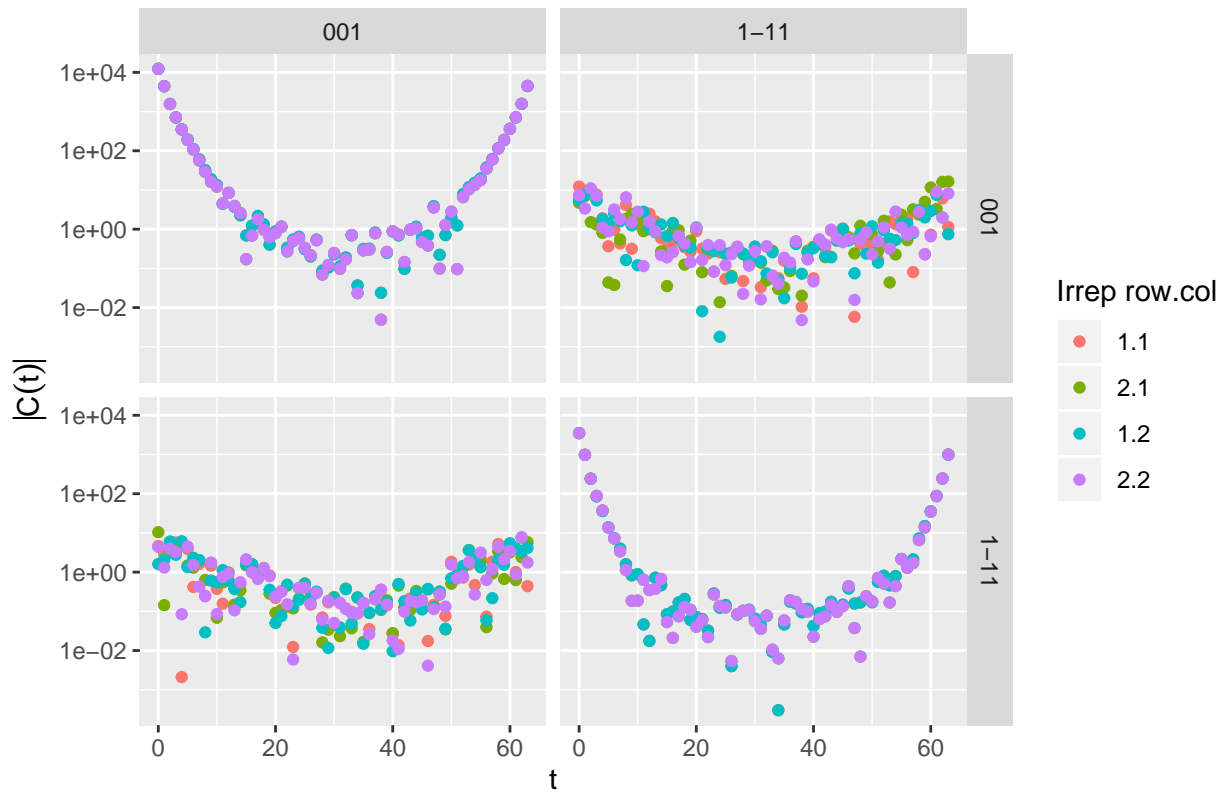
$P^2 = 3$, irrep = E, $P = -1-11$



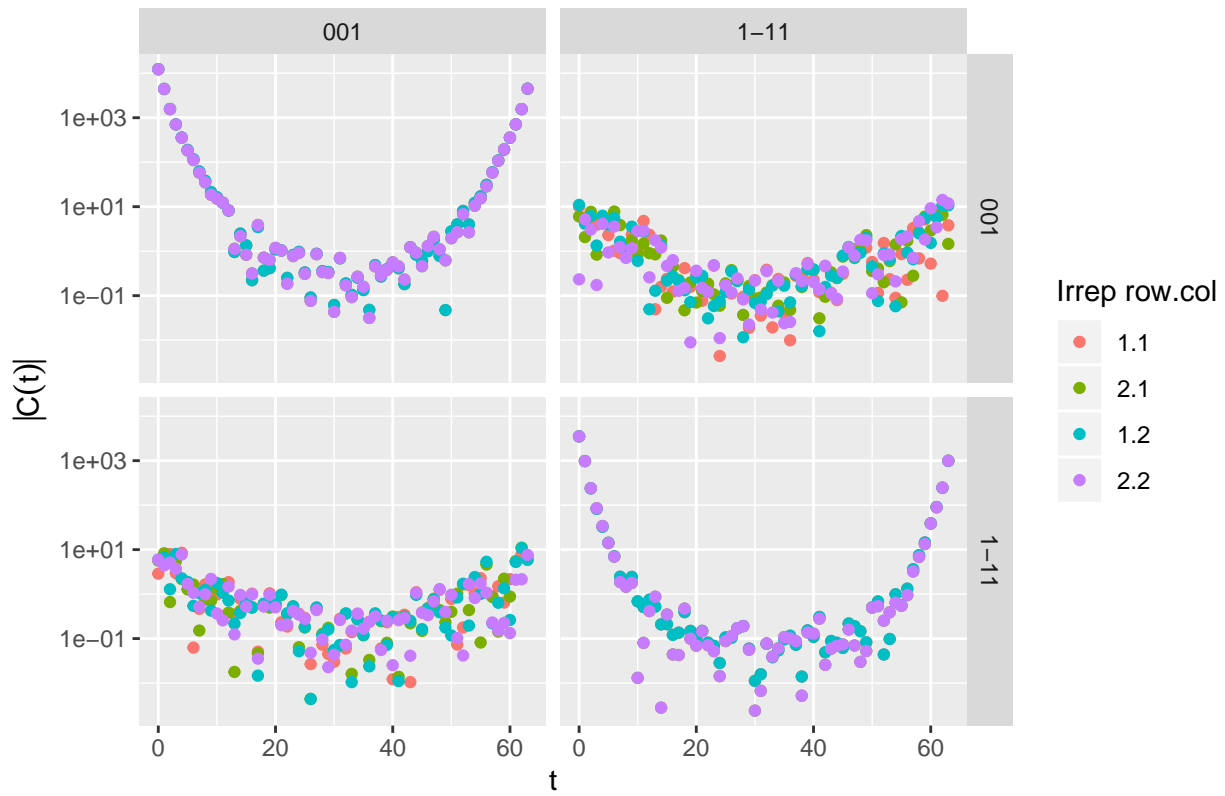
$P^2 = 3$, irrep = E, $P = -11-1$



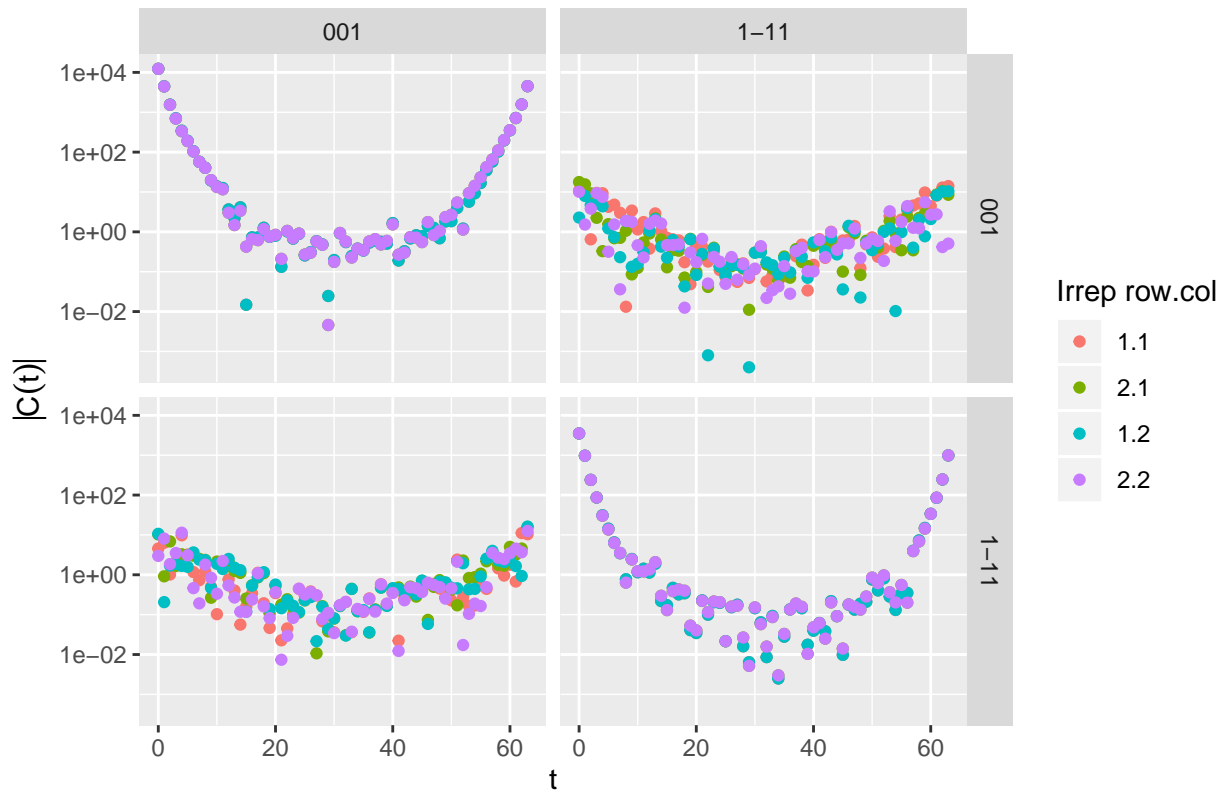
$P^2 = 3$, irrep = E, $P = -111$



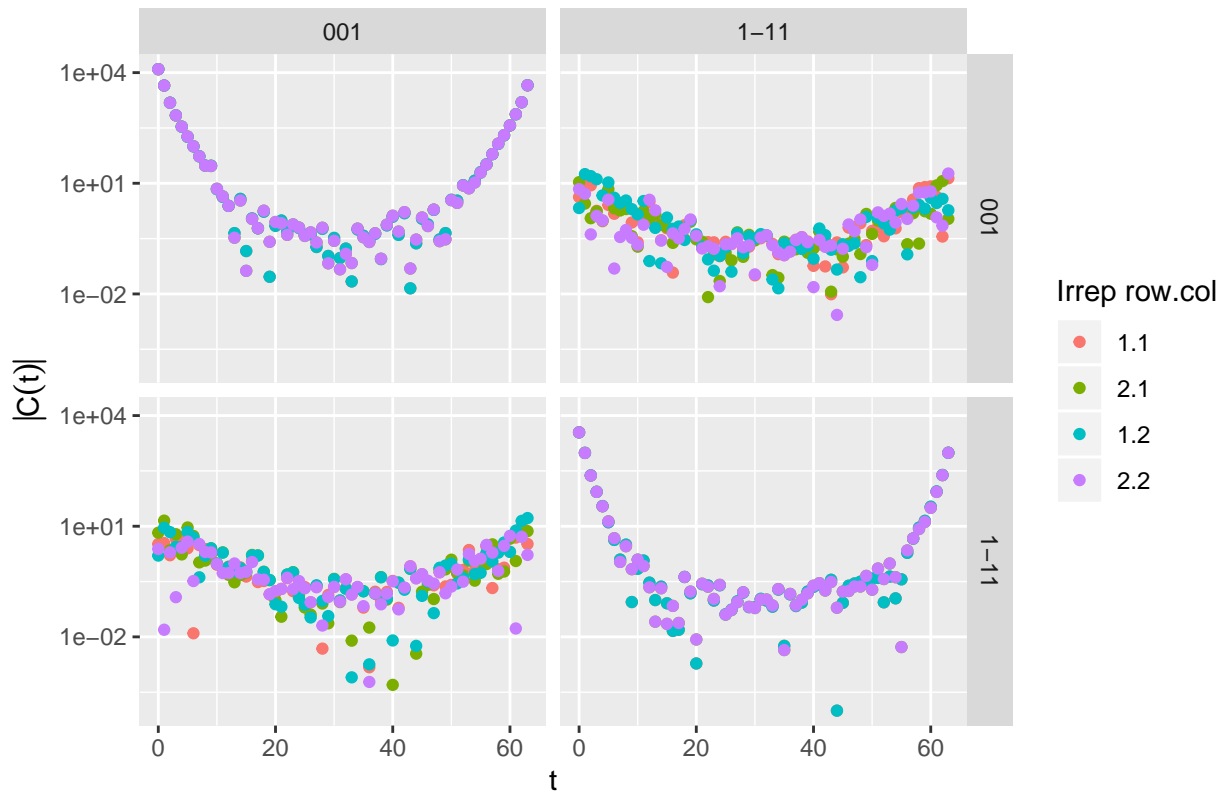
$P^2 = 3$, irrep = E, $P = 1-1-1$



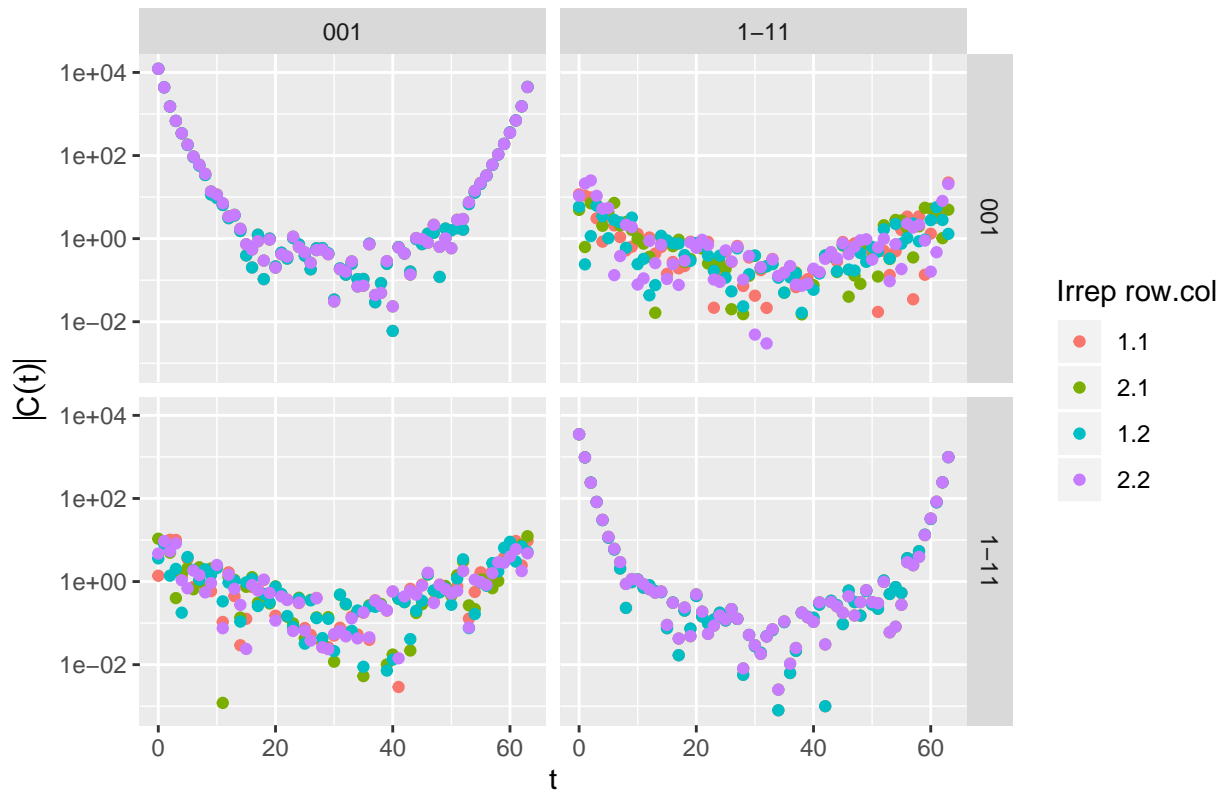
$P^2 = 3$, irrep = E, $P = 1-11$



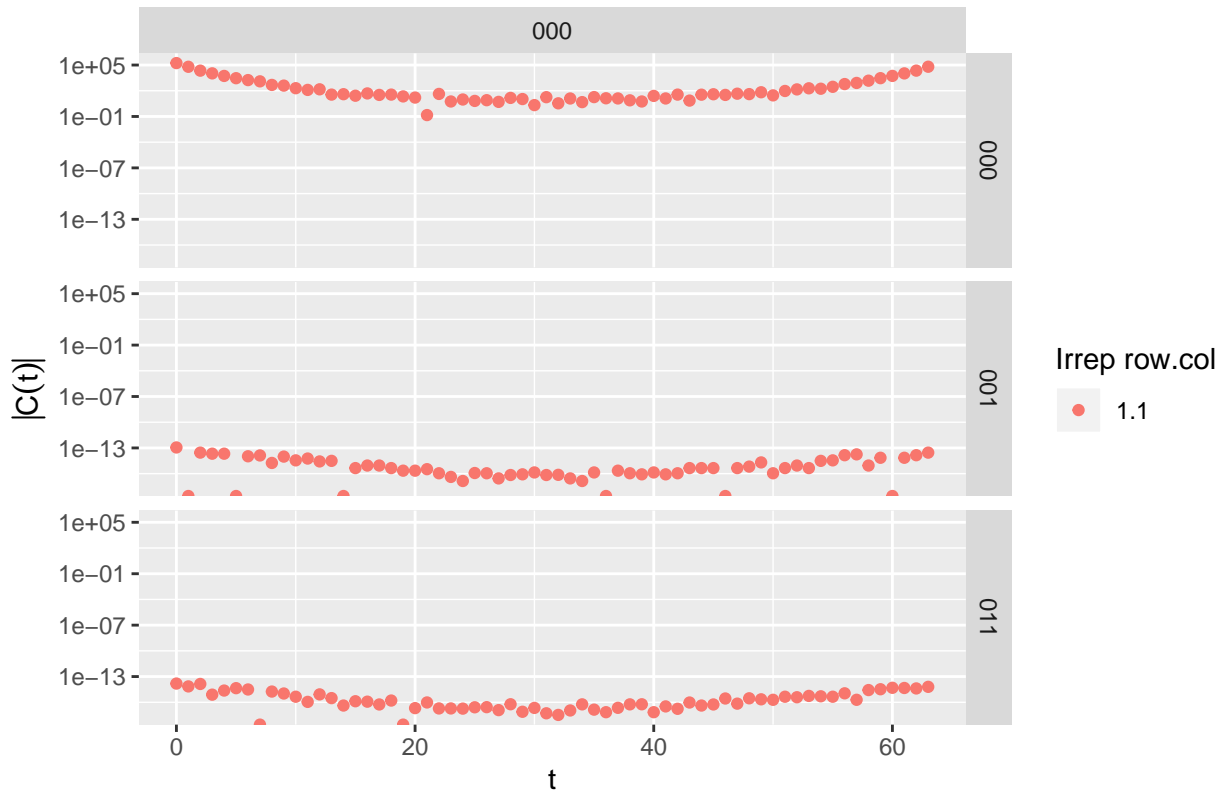
$P^2 = 3$, irrep = E, $P = 11-1$



$P^2 = 3$, irrep = E, $P = 111$

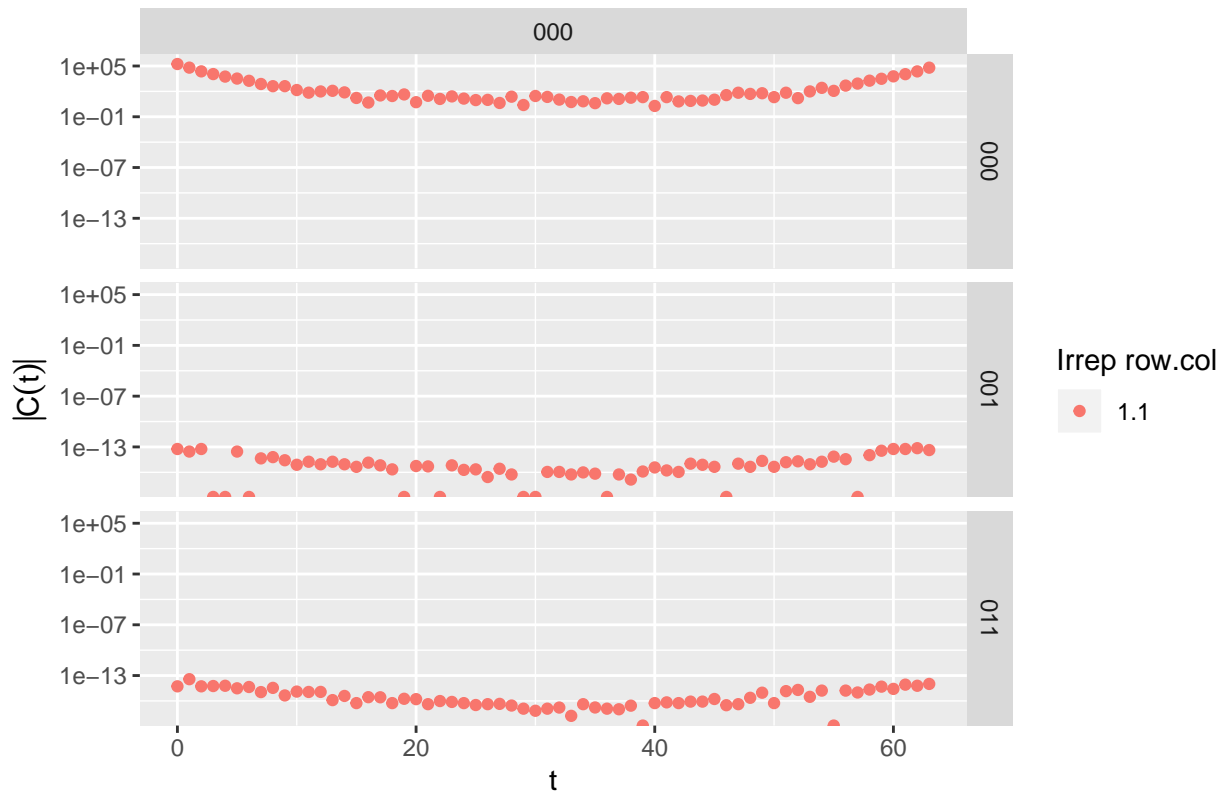


Warning: Transformation introduced infinite values in continuous y-axis
 $P^2 = 4$, irrep = A1, $P = -200$



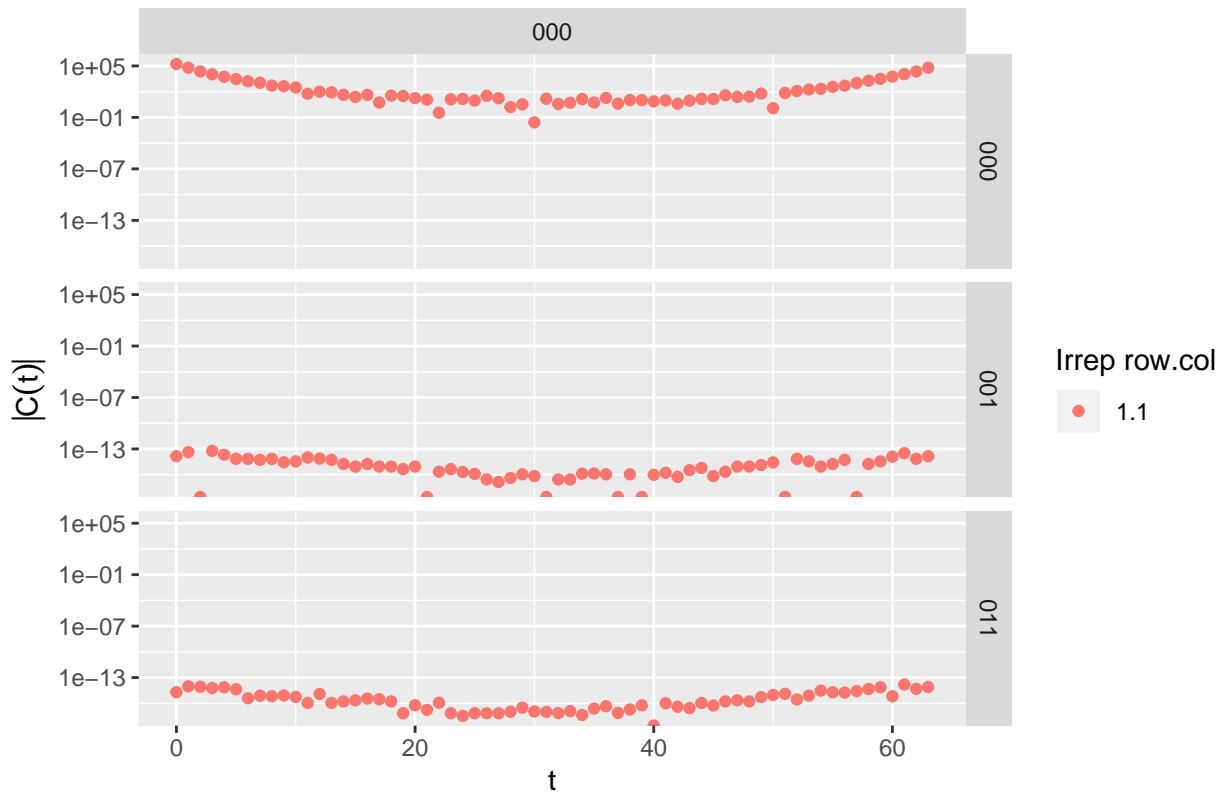
Warning: Transformation introduced infinite values in continuous y-axis

$P^2 = 4$, irrep = A1, P = 0-20



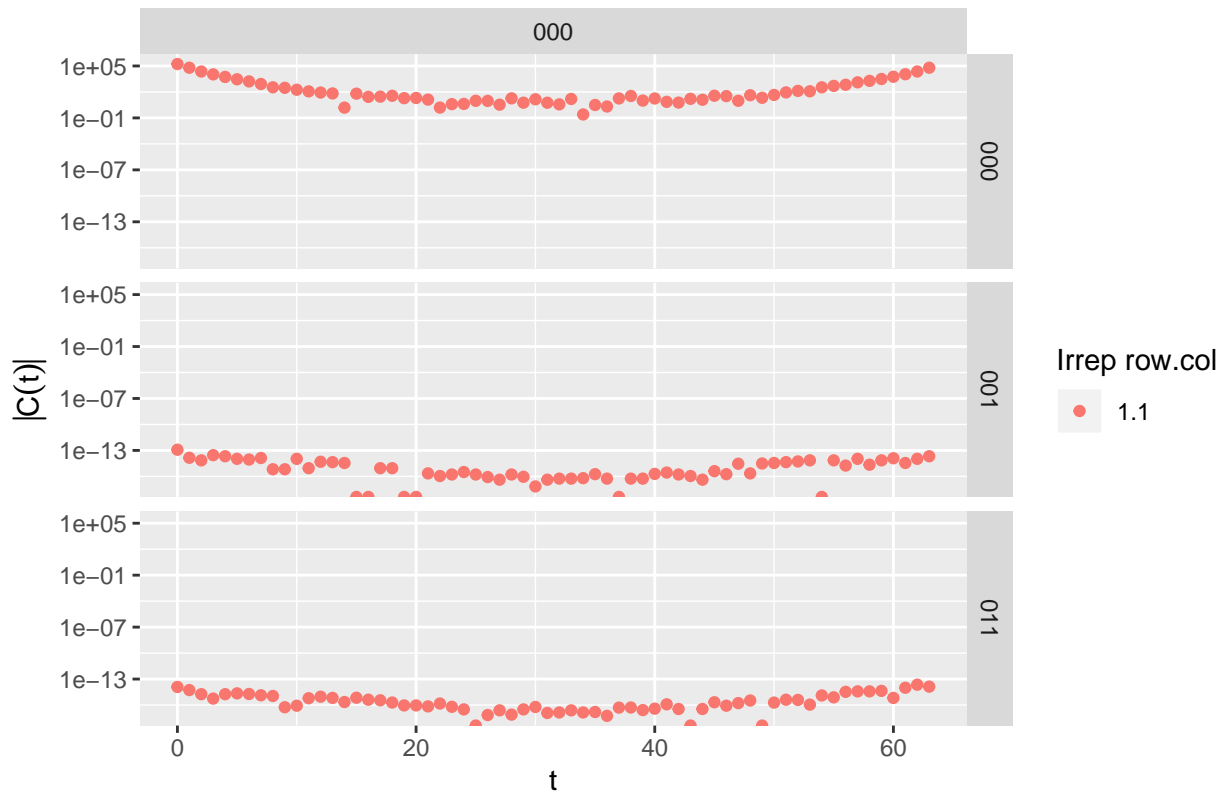
Warning: Transformation introduced infinite values in continuous y-axis

$P^2 = 4$, irrep = A1, P = 00-2



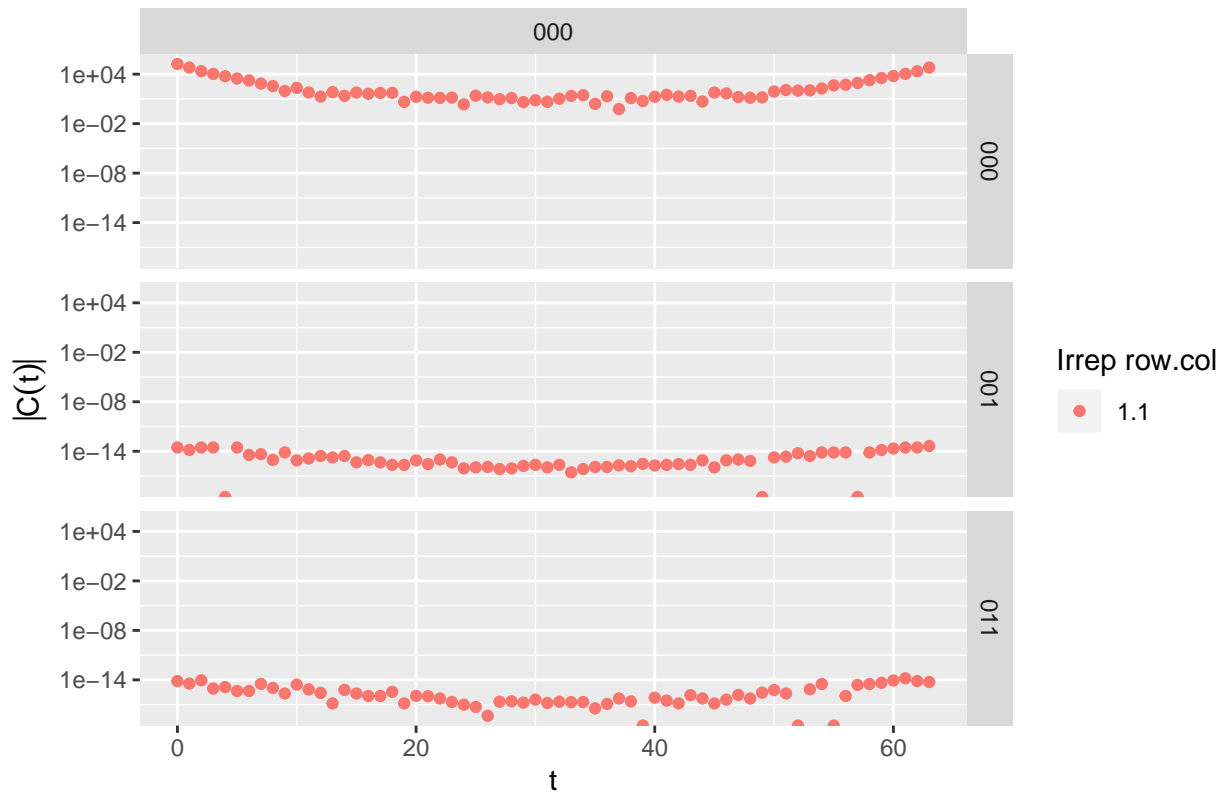
Warning: Transformation introduced infinite values in continuous y-axis

$P^2 = 4$, irrep = A1, P = 002



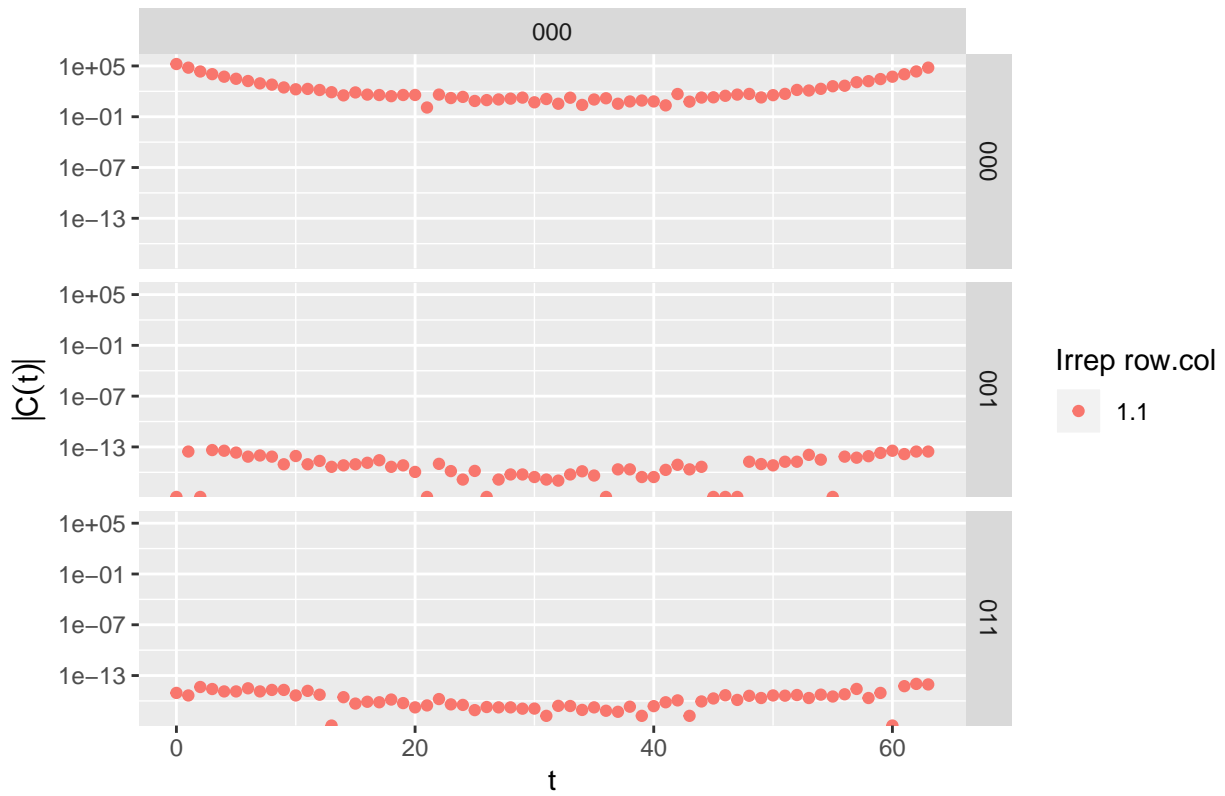
Warning: Transformation introduced infinite values in continuous y-axis

$P^2 = 4$, irrep = A1, P = 020

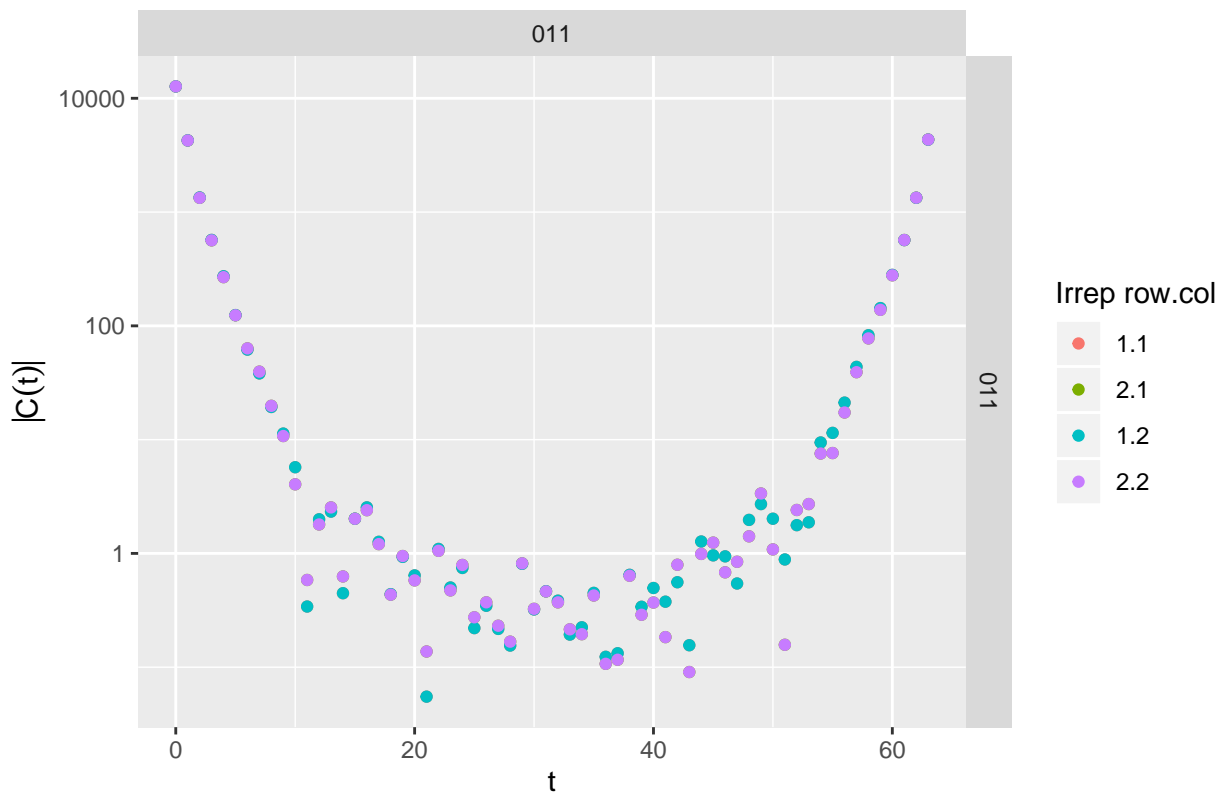


Warning: Transformation introduced infinite values in continuous y-axis

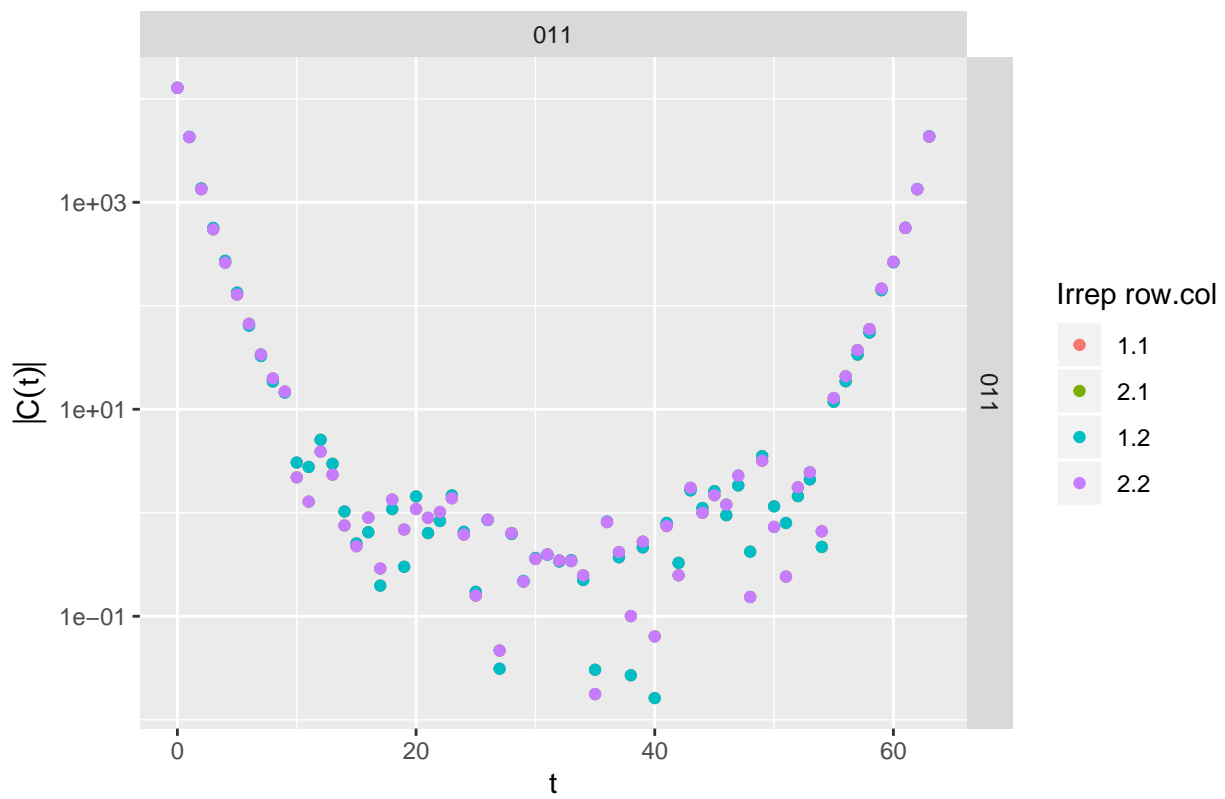
$P^2 = 4$, irrep = A1, $P = 200$



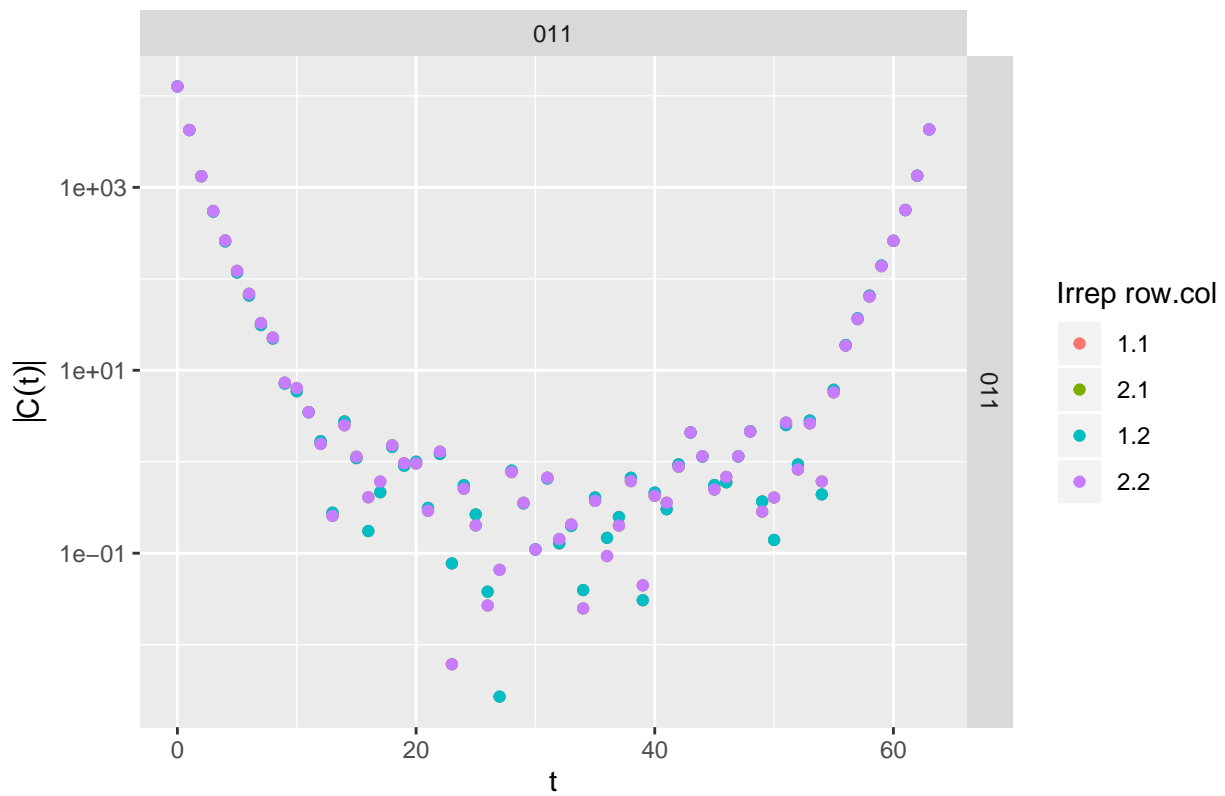
$P^2 = 4$, irrep = E, $P = -200$



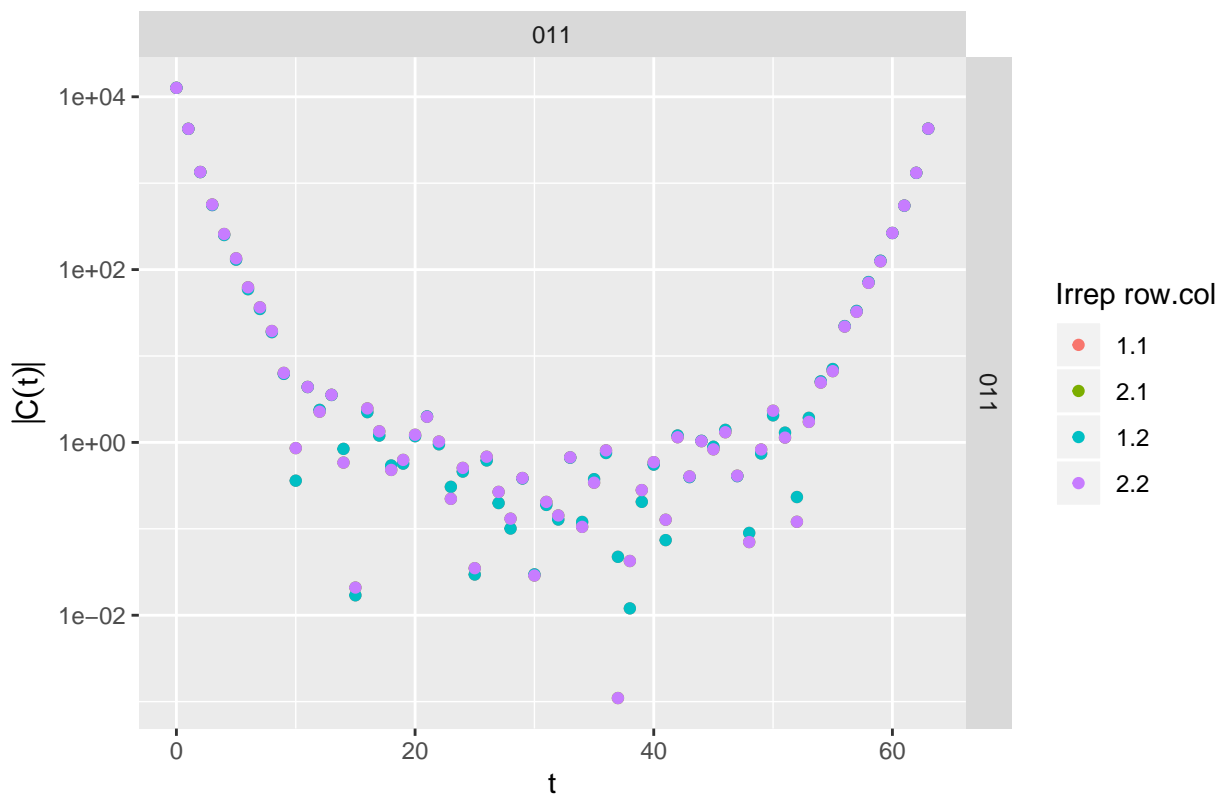
$P^2 = 4$, irrep = E, P = 0-20



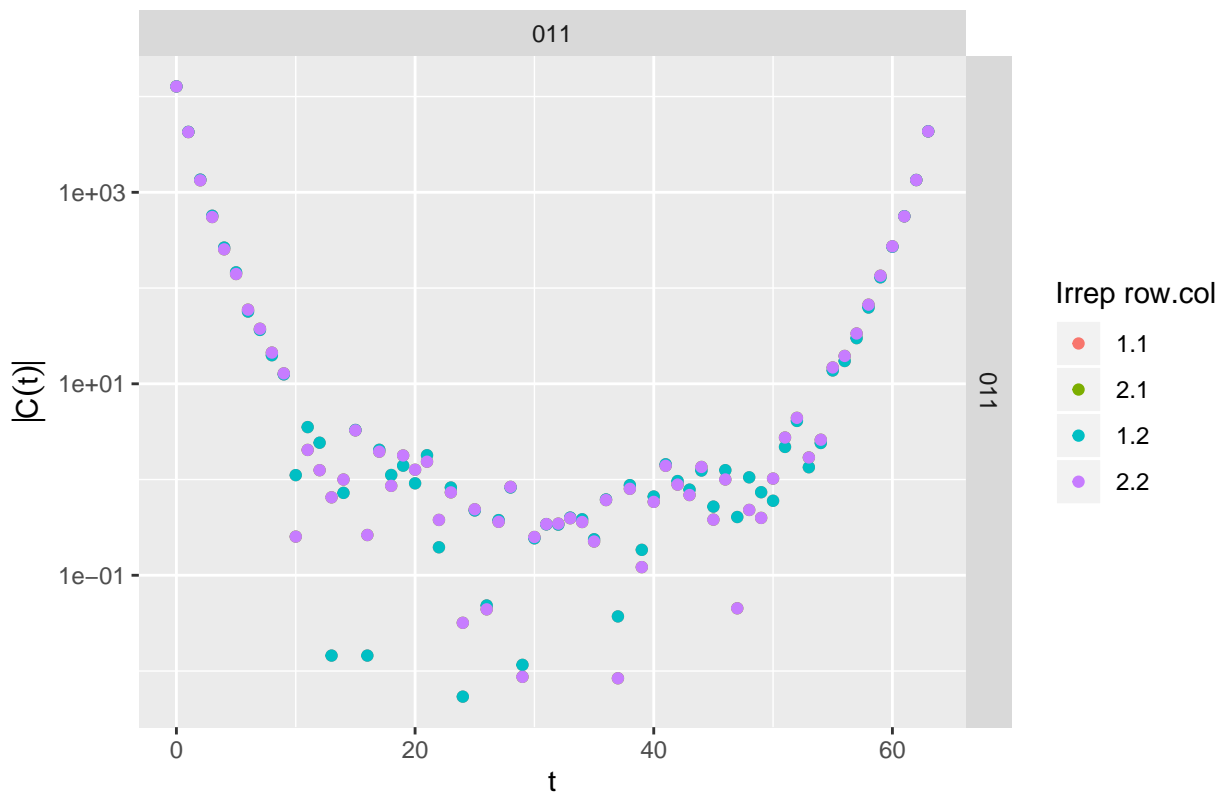
$P^2 = 4$, irrep = E, P = 00-2



$P^2 = 4$, irrep = E, $P = 002$



$P^2 = 4$, irrep = E, $P = 020$



$P^2 = 4$, irrep = E, $P = 200$

