Outline

STL Features

Strength of seasonality and trend

STL decomposition

$$y_t = T_t + S_t + R_t$$

Seasonal strength

$$\max\left(0, 1 - \frac{\mathrm{Var}(R_t)}{\mathrm{Var}(S_t + R_t)}\right)$$

Trend strength

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Lab Session 9

- Use `GGally::ggpairs()` to look at the relationships between the STL-based features. You might wish to change `seasonal_peak_year` and `seasonal_trough_year` to factors.
- Which is the peak quarter for holidays in each state?

Feature extraction and statistics

```
tourism |> features(Trips, feat_acf)

# A tibble: 304 x 10
   Region      State  Purpose    acf1  acf10 diff1_acf1 diff1_acf10 diff2_acf1 diff2_acf10
   <chr>       <chr>  <chr>      <dbl>  <dbl>      <dbl>       <dbl>      <dbl>        <dbl>
 1 Adelaide    SA     Busine~   0.0333  0.131     -0.520       0.463          -
0.676      0.741
```
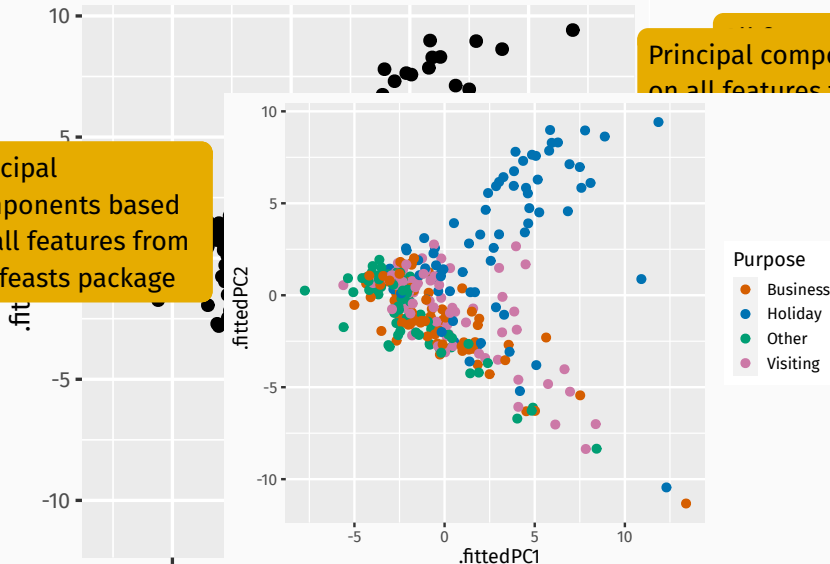
Dimension reduction for features

Principal components based on all features from the feasts package

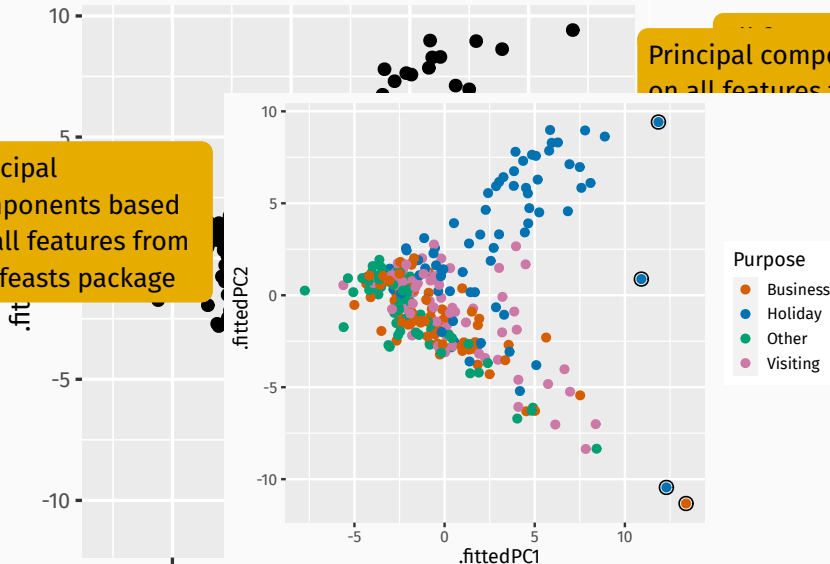Principal components based on all features from the feasts

Dimension reduction for features

Principal components based on all features from the feasts package

Principal components based on all features from the feasts

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Lab Session 10

- Use a feature-based approach to look for outlying series in `PBS`.
- What is unusual about the series you identify as outliers?