**METHOD:**The X11 decomposition method is a technique developed by the US Census Bureau and Statistics Canada, It is designed for breaking down the time series into trend, seasonal, and residual elements. but unlike classical decomposition methods, such as the additive or multiplicative decomposition, X11 offers greater flexibility by incorporating both additive and multiplicative adjustments. It also employs sophisticated techniques to handle irregular fluctuations and outliers in the data.

**TOY EXAMPLE USING CLASSICAL DECOMPOSITION:**we took the Australian Air Passengers data which we work on lab 3. the data we took is from 1950 - 1960.

**Original Data:** The first plot shows fluctuations over time, but it's not immediately clear what patterns exist or how they might evolve.

**Seasonal Component:** indicates a stable seasonal effect that does not change much over the observed period.

**Trend Component:** It appears to be steadily increasing over time, suggesting a constant upward movement in the original data's level.

**Residual Component:** this shows the random fluctuations in the data after the trend and seasonal components have been removed. These are the unpredictable elements that do not follow a clear pattern.

Here is the X11 decomposition graph which is