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**Title**

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**Introduction.** The study was conducted on time series data of the monthly total of new one-family home sales in the US. The span of the series begins in 1973 extending until November of 1995. For this duration, at least 24 houses were sold from month to month reaching a maximum of 89 homes sold. On average, approximately 52 were sold, and the median was 53 homes sold. *Figure 1* shows a visual representation of the data, and it is immediately apparent that any rises in sales is immediately followed by a drop in sales, or that strong positive correlation is followed by negative correlation. It appears to be an ongoing pattern. The two main goals are to find any significant seasonal effects on sales and to determine a reasonable one-year forecast.

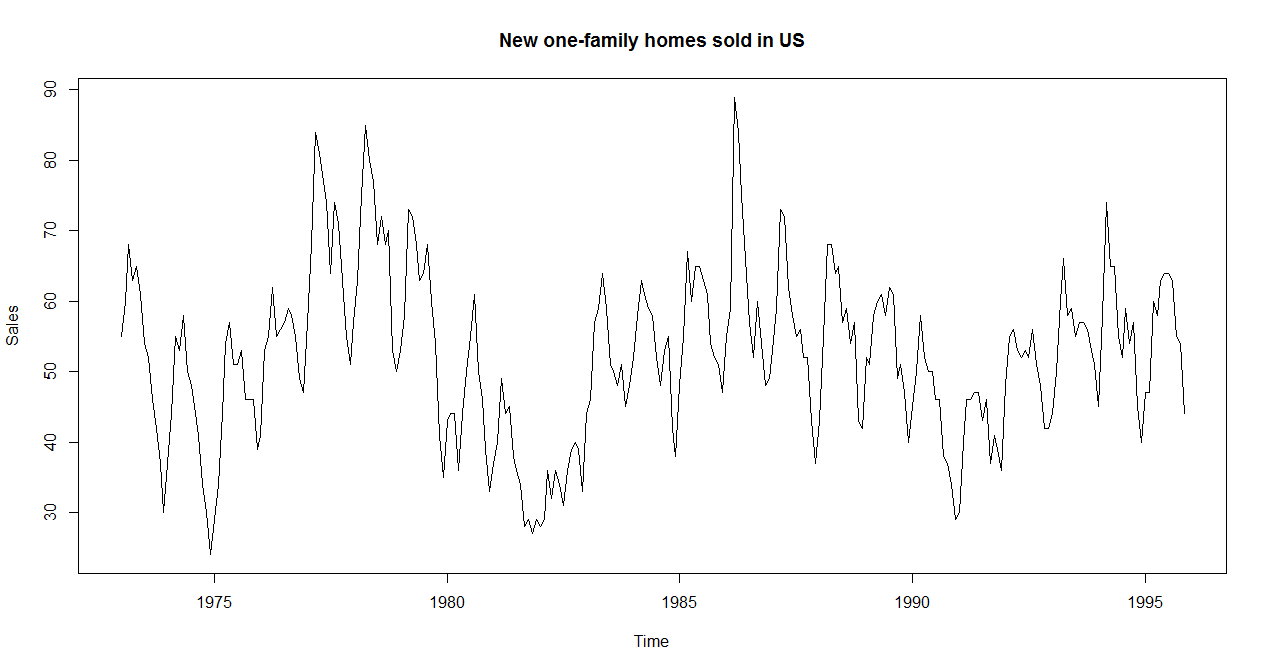


Figure 1

**Examining Periodic Effects.** The first step to finding any seasonal effects for home sales would be to locate patterns that stand out and determine if they are significant or not. This time series is composed of several different periodic effects, as shown by its spectral density in Figure 2a. Specifically, there are three cycles present by observing the ordinates computed exactly as an 8-year cycle, a 1-year cycle, and a 6-month cycle. Returning to Figure 1, starting at 1975 and following the graph to around 1983 and again to 1991 does show an 8-year cyclical pattern. Similarly, the aforementioned rising and falling of sales indicates that there is a 1-year cycle occurring. The 6-month pattern indicates an effect that happens somewhere during the year.

Each of these periodic components were tested for significance, shown in Figure 2b-d. A 95% confidence interval was constructed for each of the peaks to find if most of the remaining frequencies fall outside of it, and the blue line represents the lower bound for each frequency. Both the 8 and 1-year cycle show obvious significance, however the 6-month effect is somewhat difficult to tell just by looking at the graph. Approximately 94% of the other frequencies fall below this line, so it reasonable to say that the 6-month cycle is also significant and should be considered in the overall assessment.

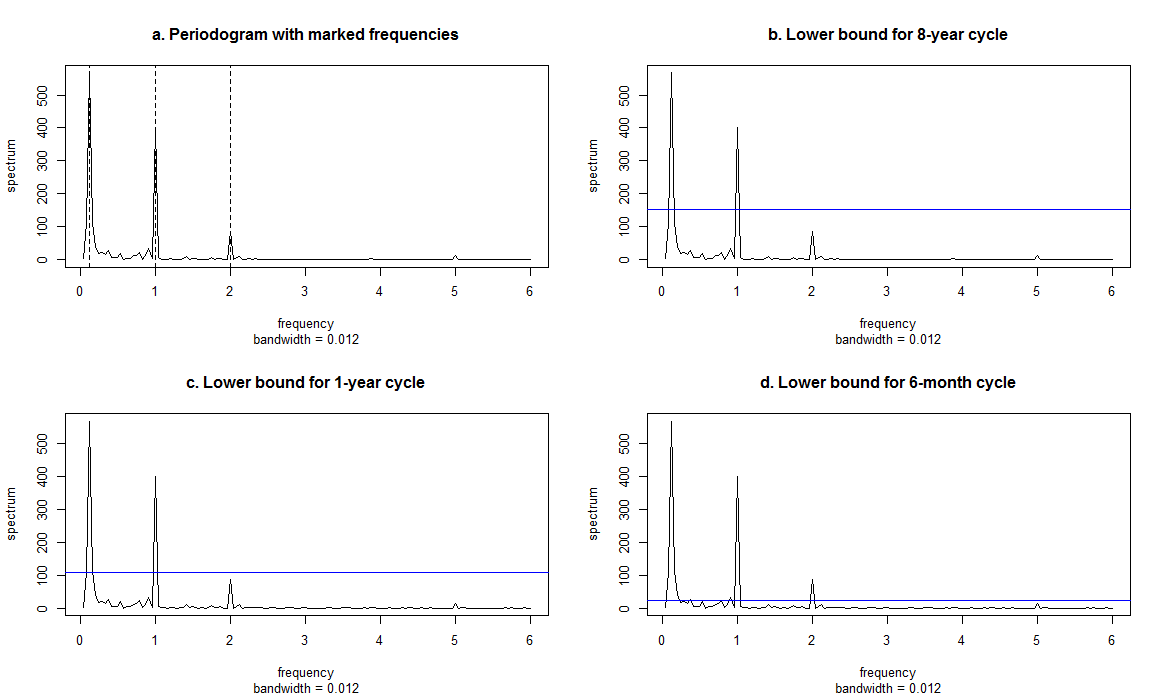


Figure 2 a. The dashed lines indicate the frequencies with an effect on sales. b. From a 95% C.I., the lower bound for the 8-year cycle. c. From a 95% C.I., the lower bound for a 1-year cycle. d. From a 95% C.I., the lower bound for a 6-month cycle. About 94% of the ordinates fell below this line.