Summer Research Project, 2010.
Boundary Filtering of Finite Time-Series

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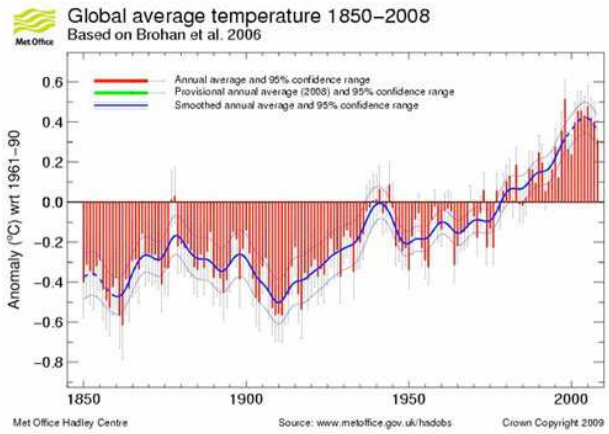
Many important time series contain signals with vital information, but this is frequently obscured by noise. Digital filtering is a technique for reducing or removing the noise to reveal the signal.

Frequently, the end of the time-series is of most interest. For example, with financial series or climate records, the series are long but recent behaviour is of particular interest. However, standard digital filters do not perform very well at the ends of the time series.

The student should investigate methods for producing filtered values valid at the end points of the time series. Such "Boundary Filters" are potentially of great value in a wide range of applications.

- **A review of the fundamentals of digital signal processing should be undertaken.**
- **The main filter types --- non-recursive (FIR), recursive (IIR), optimal, etc. --- should be investigated.**
- **Methods for designing and implementing boundary filters should be developed.**
- **These should be evaluated by application to real time series data.**
- **The results should be presented in a full report.**



Global average temperature. Bars show annual values. Blue curve is the smoothed annual average. Note that it is dashed at each end.