Forecasting Examples

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Red Wine Data

- Let W_t be the red wine data.
- We first find the trend T_t, and then define $R_t = W_t - T_t$.
- Then we find the seasonality of R_t using Fourier series, S_t, and set $X_t = R_t - S_t$.
- We then find an $ARMA(1,1)$ model for X_t.
- $W_t = T_t + S_t + X_t$.

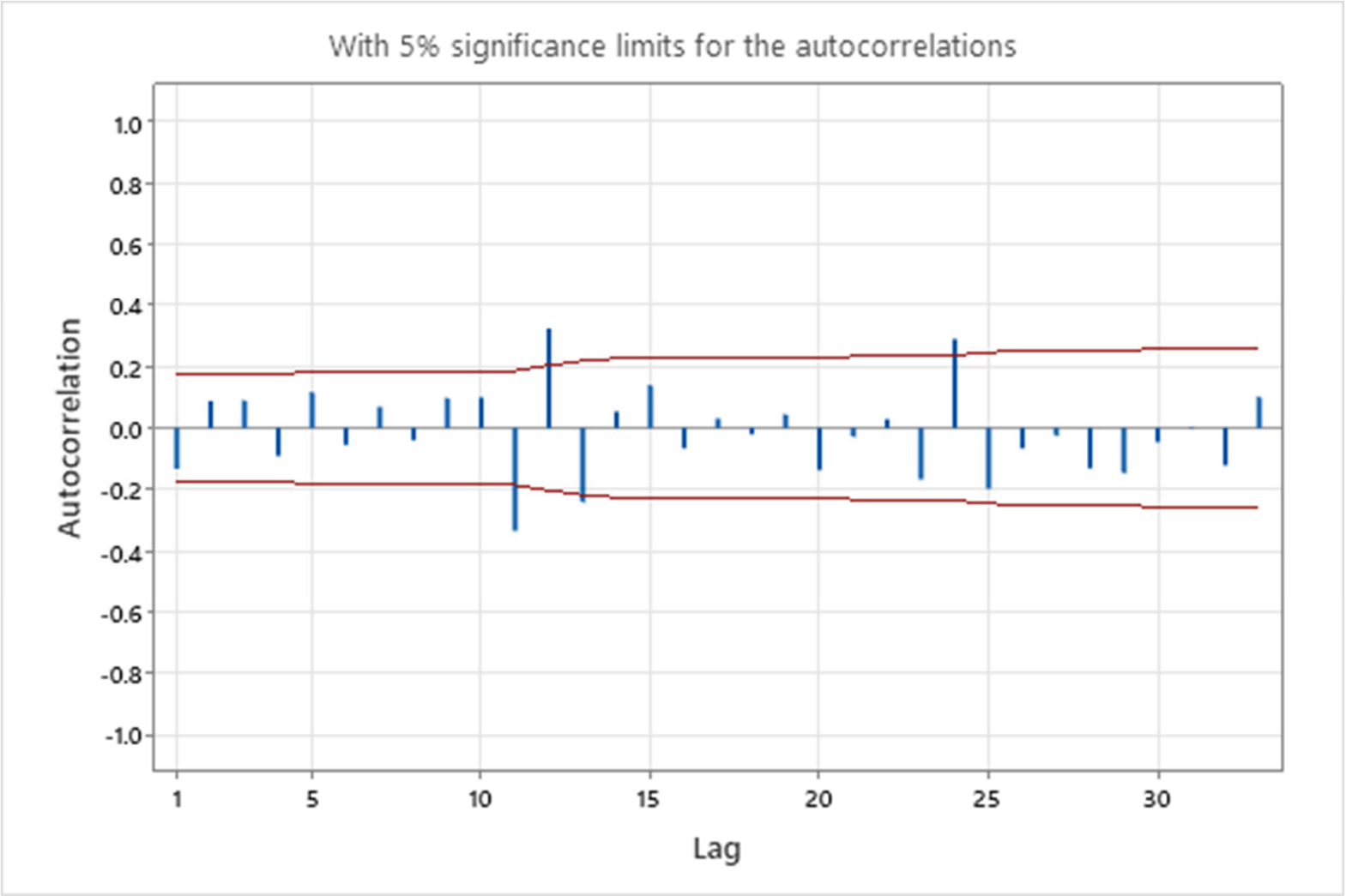
Results

$$T_t = 792.6 + 9.74t$$

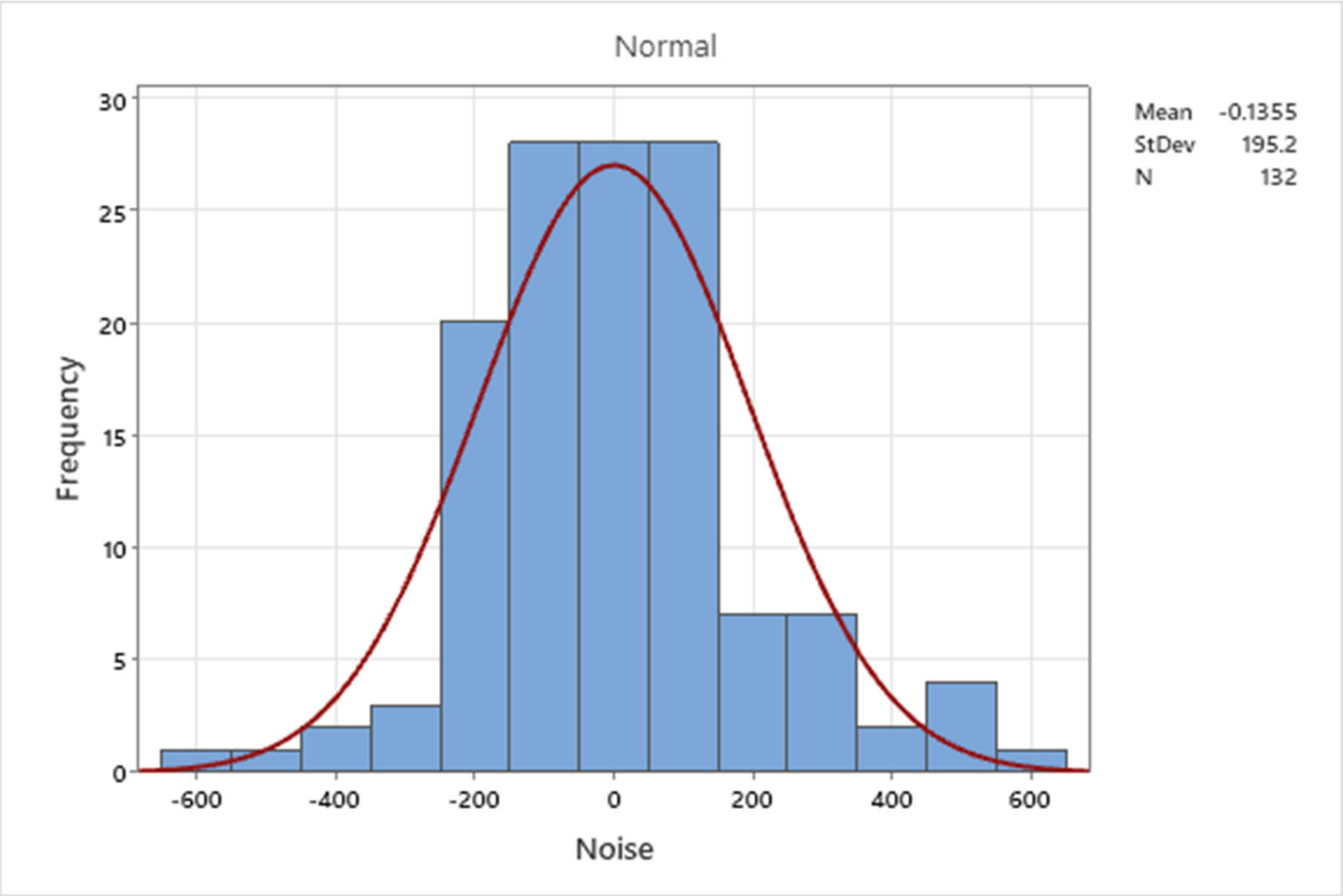
$$\begin{aligned} S_t &= -246.2\cos(\frac{2\pi}{12}) - 261.4\sin(\frac{2\pi}{12}) \\ &+ 76.4\cos(\frac{4\pi}{12}) - 9.8\sin(\frac{4\pi}{12}) \\ &+ 139.6\cos(\frac{6\pi}{12}) - 113.2\sin(\frac{6\pi}{12}) \end{aligned}$$

$$X_t = 0.9X_{t-1} + Z_t - 0.82Z_{t-1}$$

SACF of Noise



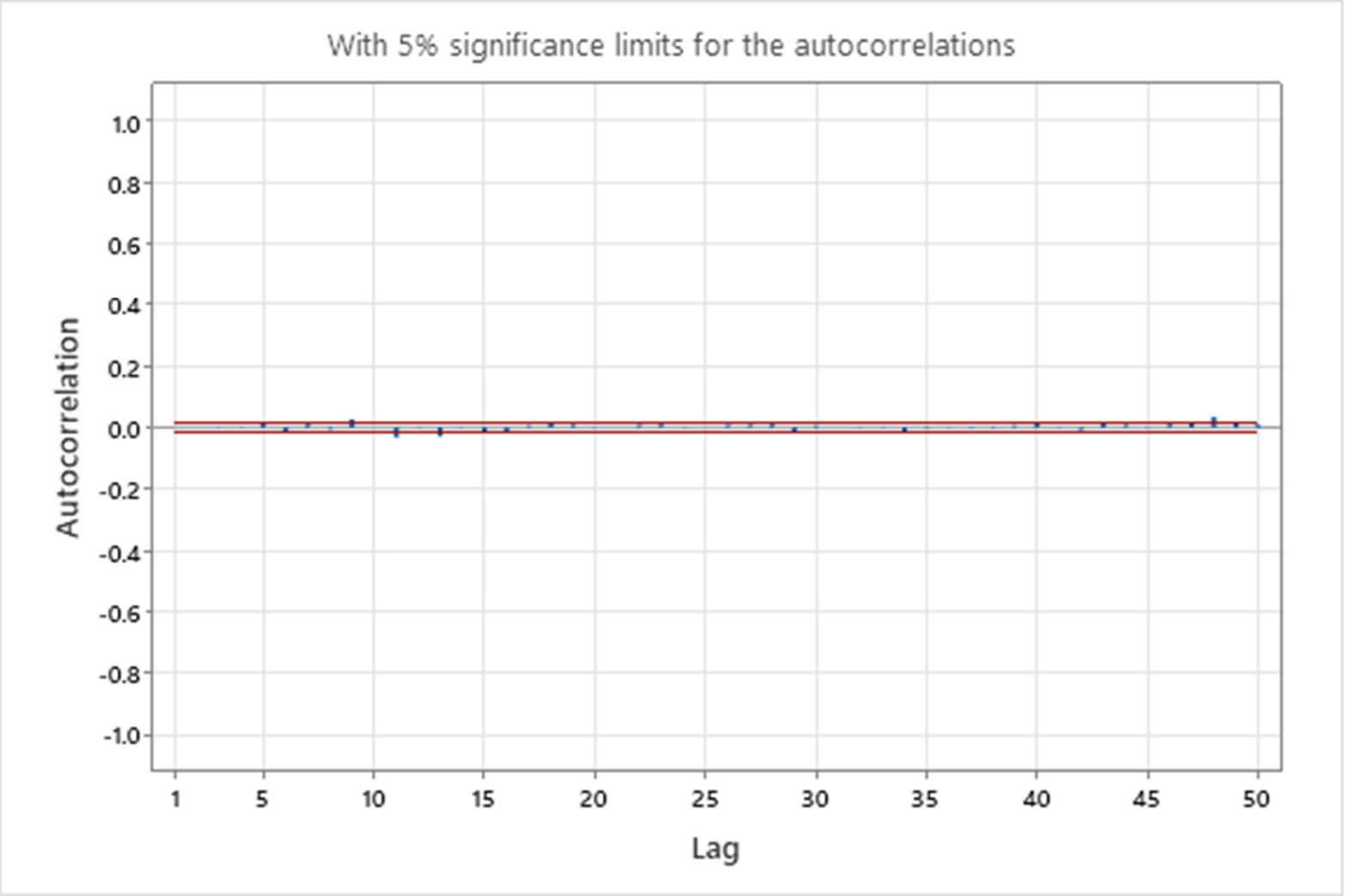
Histogram of Noise



Mt Millar Wind Farm

$$Y_t = 1.123Y_{t-1} - 0.236Y_{t-2} + 0.073Y_{y-3} + Z_t$$

SACF of Noise



Histogram of Noise