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LIST OF SYMBOLS

| Symbol | Description |
|------------------|--|
| C_x | $M \times M$ Covariance matrix |
| N | Number of data |
| M | Number of column by choose from matrix |
| N' | $N - M + 1$ |
| $N' = N - M + 1$ | Number of each rows matrix |
| P | Lag time of matrix |
| D | Matrix generated from sliding of a window size |
| E | Matrix of eigenvector |
| A | Principal components time series |
| R | Reconstruction |
| λ | Eigenvalues |
| I | Identity matrix |
| d_r | Value obtained from Willmott theory |
| P_t | Data prediction from the model at any time t |
| O_t | Data from real survey at any time t |
| \overline{O} | Average of data from real survey |