Bibliography


Notation

Below the notation which is used one several places in the text is listed. A short explanation and a reference to the page on which it is defined is included.

General

\[ R_+ \quad [0, \infty), \text{set of positive real numbers} \quad 16 \]
\[ Z_+ \quad \{1, 2, 3, \ldots\}, \text{set of positive integers} \quad 16 \]
\[ N \quad \{0, 1, 2, \ldots\}, \text{set of natural numbers} \quad 16 \]
\[ R^n_+ \quad \text{set of } n\text{-tuples of the positive real numbers} \quad 16 \]
\[ Z_n \quad \{1, 2, 3, \ldots, n\} \quad 16 \]
\[ N_n \quad \{0, 1, 2, \ldots, n\} \quad 16 \]
\[ R^{k \times m}_+ \quad \text{matrices over } R_+ \quad 16 \]
\[ S^n_+ \quad \text{simplex } \{x \in R^n_+ \mid \sum_{i=1}^n x_i = 1\} \quad 59 \]
\[ R_+[z]/(z^n - 1) \quad \text{quotient semi-ring of the semi-ring } R_+[z] \quad 69 \]
\[ S_+[z]/(z^n - 1) \quad \text{quotient monoid of the normalized monoid } S_+[z] \quad 69 \]
\[ DS^{n \times n}_+ \quad \text{set of doubly stochastic matrices} \quad 59 \]
\[ DS^{n \times n}_+ C \quad \text{set of doubly stochastic circulants} \quad 59 \]
\[ G \subseteq F \quad G \subseteq F \text{ and } G \neq F \quad 59 \]
\[ F \setminus G \quad \text{set consisting of the elements in } F \text{ that are not in } G \quad 59 \]
\[ n(a) \quad \text{order of vector } a \quad 59 \]
\[ \text{circ}(a) \quad \text{circulant generated by vector } a \quad 59 \]
\[ Z(x) \quad \{i \in Z_n \mid x_i = 0\} \text{ for } x \in R^n_+ \quad 90 \]
\[ \#Z(x) \quad \text{number of elements in } Z(x) \quad 90 \]
\[ N(x) \quad \{i \in Z_n \mid x_i > 0\} \text{ for } x \in R^n_+ \quad 90 \]
\[ \#Z(B) \quad \text{number of zero entries in matrix } B \quad 90 \]
\[ \text{Re}(\lambda) \quad \text{real part of } \lambda \in C \quad 18 \]
\[ \text{Im}(\lambda) \quad \text{imaginary part of } \lambda \in C \quad 46 \]
\[ \xi \quad \text{time shift operator} \quad 107 \]
<table>
<thead>
<tr>
<th>Notation</th>
<th>Description</th>
<th>Page(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\sigma$</td>
<td>shift operator</td>
<td>107, 115</td>
</tr>
<tr>
<td>$F_x^\sigma, F^\sigma_-$, $F^\sigma_+$, $F^\sigma$</td>
<td>$\sigma$-algebras</td>
<td>160</td>
</tr>
<tr>
<td>$I_A : \Omega \rightarrow R$</td>
<td>indicator function</td>
<td>160</td>
</tr>
<tr>
<td>$CI$</td>
<td>conditionally independent</td>
<td>160</td>
</tr>
<tr>
<td>$L(\theta : y_N)$</td>
<td>likelihood function</td>
<td>164</td>
</tr>
</tbody>
</table>

### Matrices

<table>
<thead>
<tr>
<th>Description</th>
<th>Page(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$A^T$</td>
<td>transpose of $A$</td>
</tr>
<tr>
<td>$A \geq B$</td>
<td>$a_{ij} \geq b_{ij}$ for all $i,j$</td>
</tr>
<tr>
<td>$A &gt; B$</td>
<td>$A \geq B$ and $A \neq B$</td>
</tr>
<tr>
<td>$\sigma(A)$</td>
<td>spectrum of $A$</td>
</tr>
<tr>
<td>$\rho(A)$</td>
<td>spectral radius of $A$</td>
</tr>
<tr>
<td>$I_{r \times t}$</td>
<td>$s \times t$ zero matrix</td>
</tr>
<tr>
<td>$W_n$</td>
<td>shift matrix</td>
</tr>
<tr>
<td>$S_R$</td>
<td>selector matrix</td>
</tr>
<tr>
<td>$\mathcal{N}(A)$</td>
<td>kernel of $A$</td>
</tr>
<tr>
<td>$A(i:j)$</td>
<td>rows $i,i+1,\ldots,j$ of $A$</td>
</tr>
<tr>
<td>pos-rank$(A)$</td>
<td>positive rank of $A$</td>
</tr>
<tr>
<td>r-pos-rank$(A)$</td>
<td>$r$-positive rank of $A$</td>
</tr>
<tr>
<td>p-rank$(A)$</td>
<td>positive system rank of $A$</td>
</tr>
</tbody>
</table>

### Cones

<table>
<thead>
<tr>
<th>Description</th>
<th>Page(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>cone$(S)$</td>
<td>cone spanned by the set of vectors $S$</td>
</tr>
<tr>
<td>cone$(A)$</td>
<td>cone spanned by the columns of the matrix $A$</td>
</tr>
<tr>
<td>$C_{k,m}$</td>
<td>set of polyhedral cones in $R^k_+$, with frame of $m$ vectors</td>
</tr>
<tr>
<td>$CE_{k,m}$</td>
<td>set of extremal cones</td>
</tr>
<tr>
<td>$\mathcal{F}_r(C)$</td>
<td>set of $r$-facets</td>
</tr>
</tbody>
</table>

### System theory

<table>
<thead>
<tr>
<th>Description</th>
<th>Page(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$L\Sigma$</td>
<td>class of linear dynamic systems</td>
</tr>
<tr>
<td>$L\Sigma P(n,m,k)$</td>
<td>$R^{n \times n} \times R^{m \times m} \times R^{k \times n} \times R^{k \times m} \times R^n$</td>
</tr>
<tr>
<td>$SL\Sigma P(n,m,k)$</td>
<td>$(A(p),B(p),C(p),D(p),x_0(p)) \in L\Sigma P(n,m,k) \mid p \in P$</td>
</tr>
<tr>
<td>$M(k,m)$</td>
<td>set of Markov parameters $M : \mathcal{N} \rightarrow R^{k \times m}$</td>
</tr>
<tr>
<td>$\mathcal{N}(k)$</td>
<td>set of initial parameters $\mathcal{N} : \mathcal{N} \rightarrow R^k$</td>
</tr>
<tr>
<td>$Q(k,m)$</td>
<td>$M(k,m) \times \mathcal{N}(k)$</td>
</tr>
<tr>
<td>$H(p,q)$</td>
<td>Hankel matrices</td>
</tr>
<tr>
<td>$H(\infty,q)$</td>
<td>$H(\infty,q)$</td>
</tr>
<tr>
<td>$R_r(s,t)$</td>
<td>for $r \in \mathbb{Z}_+$, ‘shifted’ Hankel matrix</td>
</tr>
<tr>
<td>$H_{\alpha}(p,q)$</td>
<td>for $\alpha \in \mathbb{R}$, Hankel matrix for $(A + \alpha I, B, C)$</td>
</tr>
</tbody>
</table>