Design of Portfolio of Stocks to Track an Index

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1 Comparison with other packages

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3.1 `learnGraphTopology`: Learning the topology of graph

The goal of `learnGraphTopology()` is to estimate the Laplacian matrix generated by the weight vector of graph, $\mathbf{w}$.

Algorithm 1

1. Choose initial values for $\mathbf{w}$, $\mathbf{U}$, $\mathbf{\Lambda}$, and β, and compute $\mathcal{L}\mathbf{w}^{(0)}$
2. Define the number of components K and tunning parameters, α, α_1, α_2, ρ
3. Set $j = 0$, while not converged do
4. Set $i = 0$, while not converged do
5. Update $\mathbf{w}$, $\mathbf{w}^{(i+1)} \leftarrow f_{\mathbf{w}}(\mathbf{w}^{(i)}, \mathbf{U}^{(i)}, \mathbf{\Lambda}^{(i)}, \beta, n, \mathbf{K})$
6. Update $\mathbf{U}$, $\mathbf{U}^{(i+1)} \leftarrow f_{\mathbf{U}}(\mathbf{w}^{(i+1)}, n, K)$
7. Update $\mathbf{\Lambda}$, $\mathbf{\Lambda}^{(i+1)} \leftarrow f_{\mathbf{\Lambda}}(\alpha_1, \alpha_2, \beta, \mathbf{w}^{(i+1)}, \mathbf{U}^{(i+1)}, n, K)$
8. $i \leftarrow i + 1$
9. $\beta \leftarrow \beta(\rho + 1)$
10. Repeat steps $4 - 9$ until convergence
11. Compute $\mathcal{L}\mathbf{w}^{(i)}$
12. $j \leftarrow j + 1$
13. Repeat steps $3 - 12$ until convergence
14. Return $\mathcal{L}\mathbf{w}^{(i)}$

References