

Table of Contents

Introduction	1
1. Background	3
1.1. Gaussian Processes	3
1.1.1. Gaussian Process Regression	4
1.2. Spectral Representation of Stationary Kernels	5
1.3. Multi-Output Gaussian Processes	7
1.3.1. Multi-Output Gaussian Process Regression	8
1.4. Existing work on Multi-Output Gaussian Processes	9
1.4.1. Linear Model of Coregionalization	9
1.4.2. Intrinsic Coregionalization Model	10
1.4.3. Semi-Parametric Latent Factor Model	10
1.4.4. Convolution Model	11
1.4.5. Cross-Spectral Mixture kernel	12
1.4.6. Multi-Output Spectral Mixture Kernel	13
1.5. Harmonizable Processes	14
2. Multi-Output Harmonizable Spectral Mixture Kernel	17
2.1. Derivation of the Proposed Kernel	17
2.2. Relationship with Other Models	22
2.3. Expressiveness of the Model	23
2.4. Practical Considerations	24
2.4.1. Training and Prediction	24
2.4.2. Parameter Initialization	25
2.5. Varying the Global Component of the Spectral Densities	27
3. Experiments	30
3.1. Learning Derivatives and Delayed Signals	30
3.2. GONU Data	32
3.3. EEG Data	35
Conclusion	37
Bibliography	38