Abstract: We consider the missing value problems using a model-based technique on a bivariate CARMA random field.

We are dealing with point observations in a random field which is two-dimensional rather than discrete observations. The problem occurs when the amount of observations is too large and there are a large number of missing values which is impossible to be removed. So, we create the bivariate continuous ARMA model, which is an analogue of ARMA model in continuous context, to give an estimation of the missing data.

The bivariate CARMA model defines the CARMA random field via an integral of a kernel function g(x) over Levy noises, which is a hierarchical Bayes model. We apply empirical Bayes method for parameter estimation. Especially for setting hyper-parameters, we choose the whittle likelihood where the model is in Fourier domain and the formulation is based on the discrete Fourier transform and its power spectral density.