FoSR

SG

2022-11-10

Function on Scalar Regression

Post

$$
\begin{aligned}
Y_{ij}(t) &= f_0(t) + f_1(t) * I(user = occasional) + f_2(t) * I(user = daily) + b_i(t) + \epsilon_i(t) \\
&\quad b_i(t) \sim GP(0, \Sigma_b) \\
&\quad \epsilon_i(t) \sim N(0, \sigma^2_\epsilon) \\
&= \sum_{k=1}^{K} \xi_{0k}\phi_{0k}(t_i) + \sum_{k=1}^{K} \xi_{1k}\phi_{1k}(t_i) * I(user = occasional) + \sum_{k=1}^{K} \xi_{2k}\phi_{2k}(t_i) * I(user = daily) + \sum_{k=1}^{K} \xi_{ik}\phi_k(t_i) + \epsilon_i(t)
\end{aligned}
$$

Mean function for non-user

$$
\begin{aligned}
Y_{ij}(t) &= f_0(t) \\
&= \sum_{k=1}^{K} \xi_{0k}\phi_{0k}(t_i) \\
&= \Phi_0\xi_0
\end{aligned}
$$

Mean function for occasional user

$$
\begin{aligned}
Y_{ij}(t) &= f_0(t) + f_1(t) \\
&= \sum_{k=1}^{K} \xi_{0k}\phi_{0k}(t_i) + \sum_{k=1}^{K} \xi_{1k}\phi_{1k}(t_i) \\
&= \Phi_0\xi_0 + \Phi_1\xi_1 \\
&= [\Phi_0, \Phi_1]\xi
\end{aligned}
$$

Mean function for daily user

$$
\begin{aligned}
Y_{ij}(t) &= f_0(t) + f_2(t) \\
&= \sum_{k=1}^{K} \xi_{0k}\phi_{0k}(t_i) + \sum_{k=1}^{K} \xi_{2k}\phi_{2k}(t_i) \\
&= \Phi_0\xi_0 + \Phi_2\xi_2 \\
&= [\Phi_0, \Phi_2]\xi
\end{aligned}
$$