Gaussian Process Regression (GPR) has proven to be an extremely useful methodology in classification, machine learning, geostatistics, genetic analysis, and so on. Estimation of GPR hyperparameters can be done using empirical Bayes methods, that is, by maximizing the marginal likelihood function. A major potential problem, which appears to have received relatively little attention in the literature, is the possible existence of multiple local maxima of the marginal likelihood, as function of the hyperparameters, even for relatively simple problems. In fact, due to the non-convexity of the function, the optimization algorithm may not converge to the global maximum. This project will investigate the circumstances in which multiple local maxima can occur and strategies for finding the global maximum. Analyzing a first simple case, the work will be based on mathematical and numerical analysis of the marginal likelihood function and simulations. The results reveal that the estimated probability of having multiple local maxima, even for a very simple case, is positive.