

Standard methods in computer model calibration treat the calibration parameters as constant throughout the domain of control inputs. In many applications, systematic variation may cause the best values for the calibration parameters to change between different settings. When not accounted for in the code, this variation can make the computer model inadequate. In this article, we propose a framework for modeling the calibration parameters as functions of the control inputs to account for a computer model's incomplete system representation in this regard while simultaneously allowing for possible constraints imposed by prior expert opinion. We demonstrate how inappropriate modeling assumptions can mislead a researcher into thinking a calibrated model is in need of an empirical discrepancy term when it is only needed to allow for a functional dependence of the calibration parameters on the inputs. We apply our approach to plastic deformation of a visco-plastic self-consistent material in which the critical resolved shear stress is known to vary with temperature.