

## DEALING WITH SYMBOLS WITH MULTIPLE MEANINGS IN INFERENCE STATISTICS

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A mathematical symbol can change meaning without warning, like in solving an optimization problem. The derivation of a maximum likelihood (ML) estimate inherits this issue, resulting in the parameter symbol  $\theta$  acquiring multiple meanings in close proximity to each other. It is proposed that the instructor ought to explicitly indicate key points where the meaning of  $\theta$  changes, and to introduce the hat notation  $\hat{\theta}$  for the ML estimator carefully. In particular, the use of  $\hat{\theta}$  for a realization, i.e., an estimate, should be avoided. It will be demonstrated that words are powerful tools for untangling the overworked symbols, hence can be valuable for students to master the central ideas of inferential statistics.