1125-49-2503 **Mila Nikolova*** (`nikolova@cmla.ens-cachan.fr`), CMLA, CNRS, ENS Cachan, Universite Paris-Saclay, 94235 Cachan, France. *Bayesian statistics in variational inverse problems.* Preliminary report.

We address inverse problems where an unknown signal or image has to be recovered from noisy and often incomplete data. Typical solutions are defined as minimizers of variational objectives where a data term is based on the log-likelihood and prior information is incorporated in a regularization term. These variational objectives are conceived using several approaches – PDE's, regularization, statistics, along with some adjustments. Commonly, the designed variational objectives are presented in a Bayesian estimation framework.

We focus on the Bayesian setup in variational methods. Bayesian estimators minimise the Bayes' risk which includes a posterior model and a loss function. The popular 0-1 loss leads to the MAP (maximum a posteriori) estimator. MAP is directly related to variational objectives. A pitfall of the MAP interpretation of variational objectives is that knowledge on the data model and the prior is usually violated. Another loss is quadratic yielding the posterior mean (PM) estimator. The PM solution with a given non-normal prior equals the MAP solution for a different prior. Other distortions arise with discretization refinement. Current Bayesian modelling in inverse problems deserves revision. We present state of the art results and suggest further directions. (Received September 20, 2016)