



## **Effect of measurement error on predictions of linear wave dispersion relations**

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The presence of a sub-surface shear current can strongly affect the dispersion of surface waves. We consider linear waves atop a flow with an arbitrary depth-dependent horizontal shear. Given a horizontal velocity profile  $U \in C^2([-h, 0], \mathbb{R}^2)$ , the dispersion relation can be calculated numerically and fast methods for this purpose have recently been developed. However, the typical practical scenario is that  $U(z)$  is reconstructed from a finite set of data points obtained from measurements, for example with submerged probes, with inherent uncertainty. We characterise and quantify the effect of measurement error on the predicted dispersion relation from such a data set, and discuss the optimal method of constructing  $U(z)$  from a small set of data points with known uncertainty.