

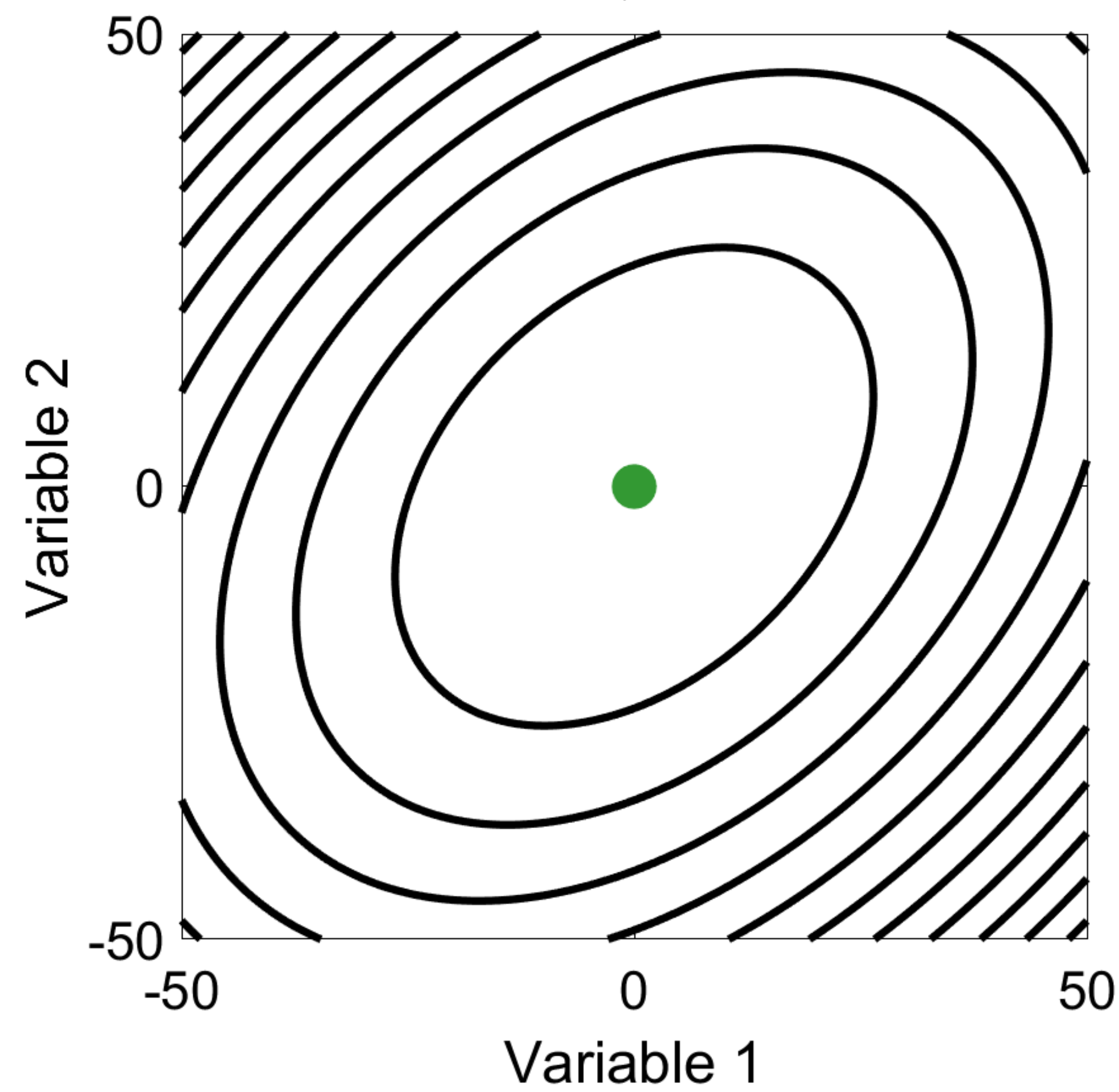
Null-space shuttles for uncertainty quantification in FWI

Scott Keating* and Kris Innanen

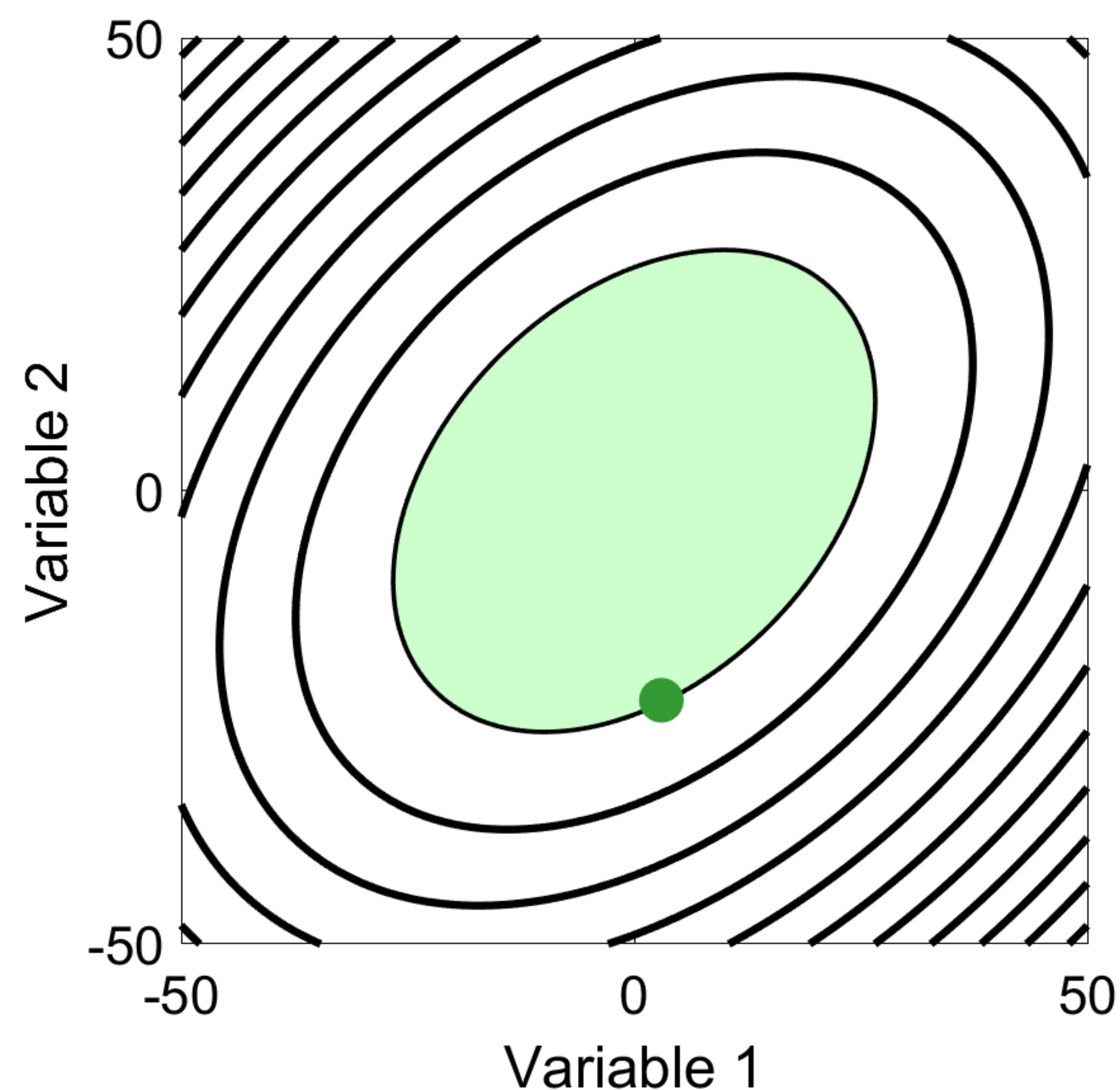
FWI uncertainty

In FWI, we **try** to solve

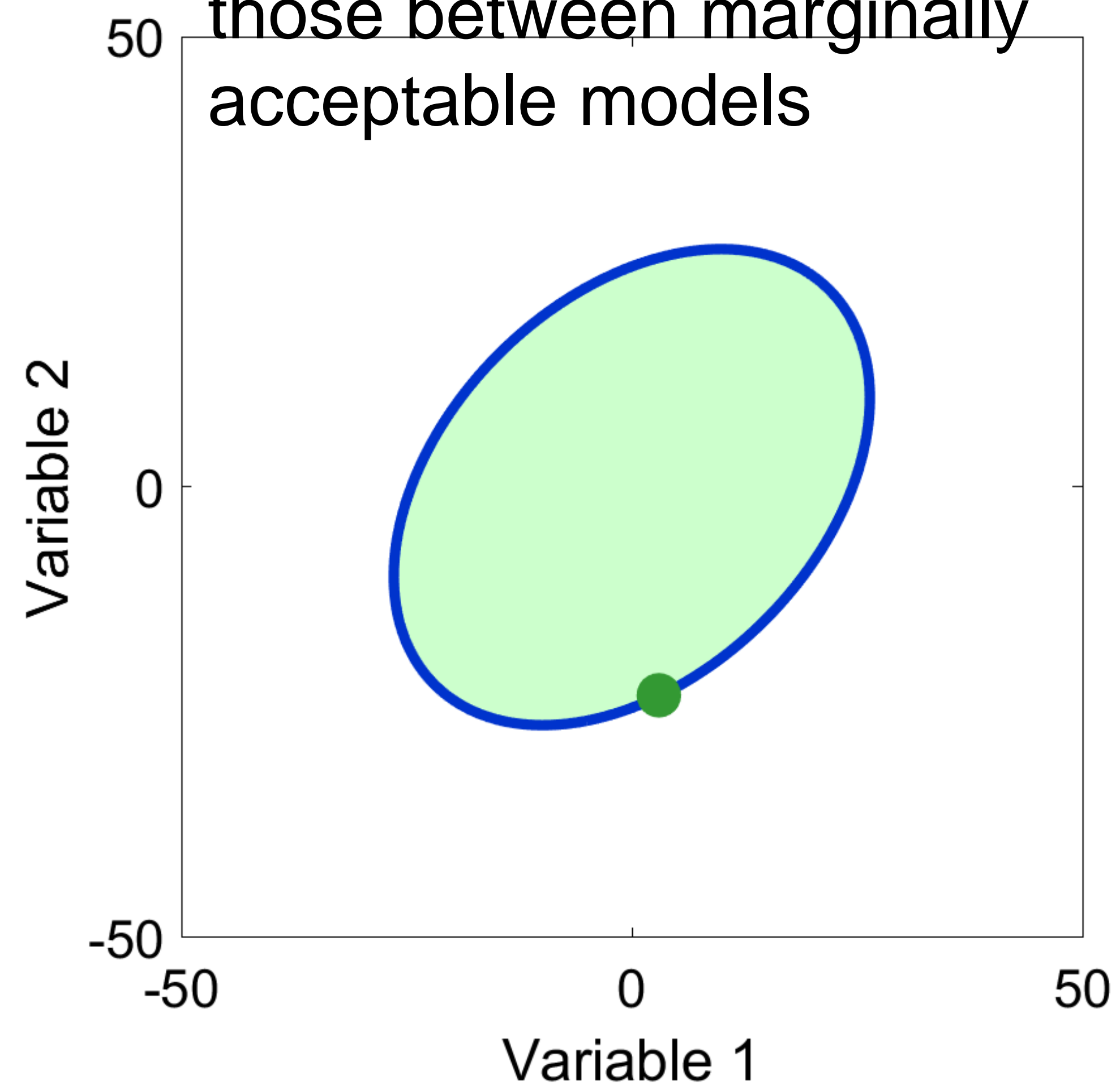
$$\min_m \phi$$



In reality, there is a range of acceptable solutions

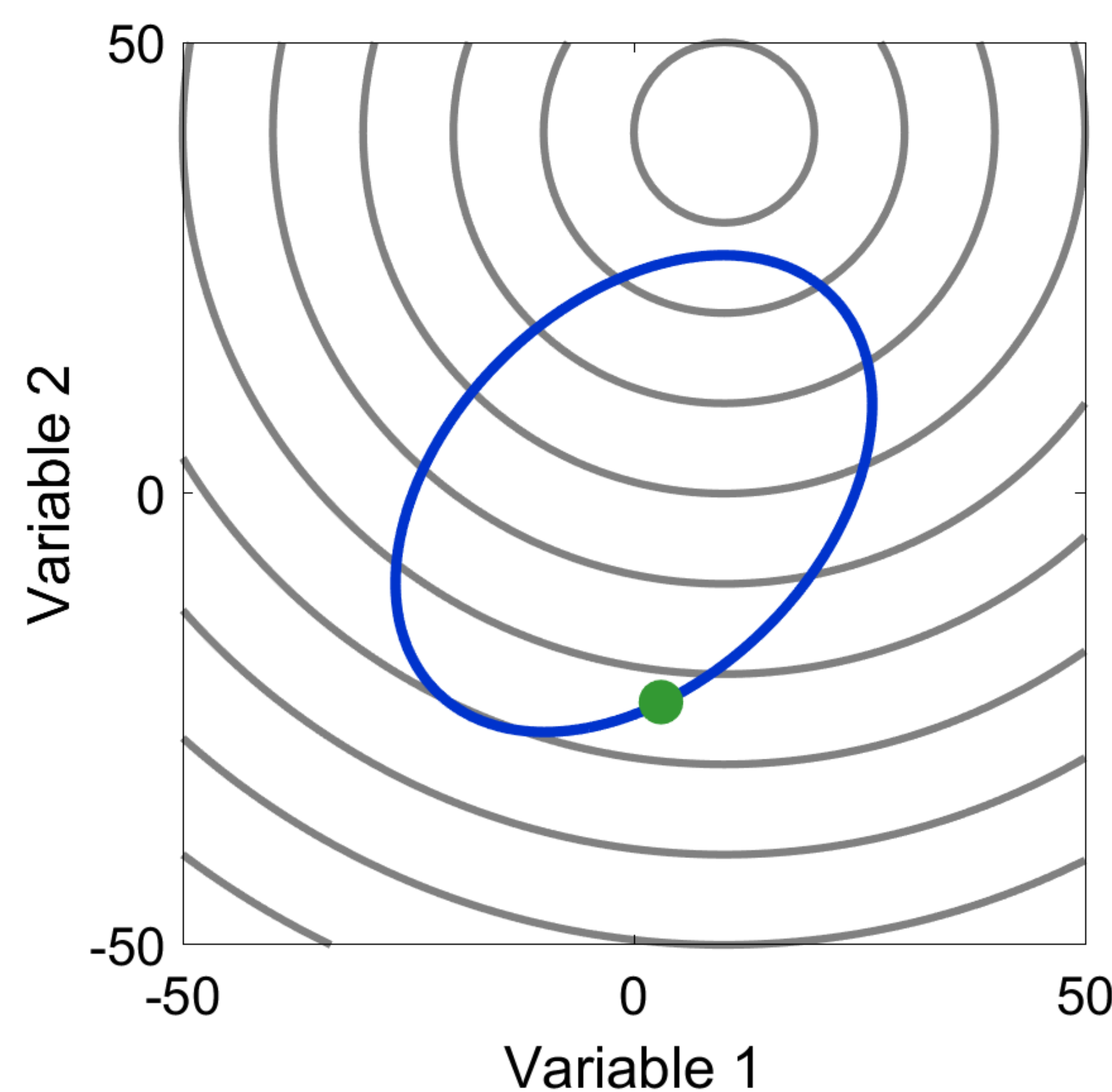


The largest uncertainties are those between marginally acceptable models

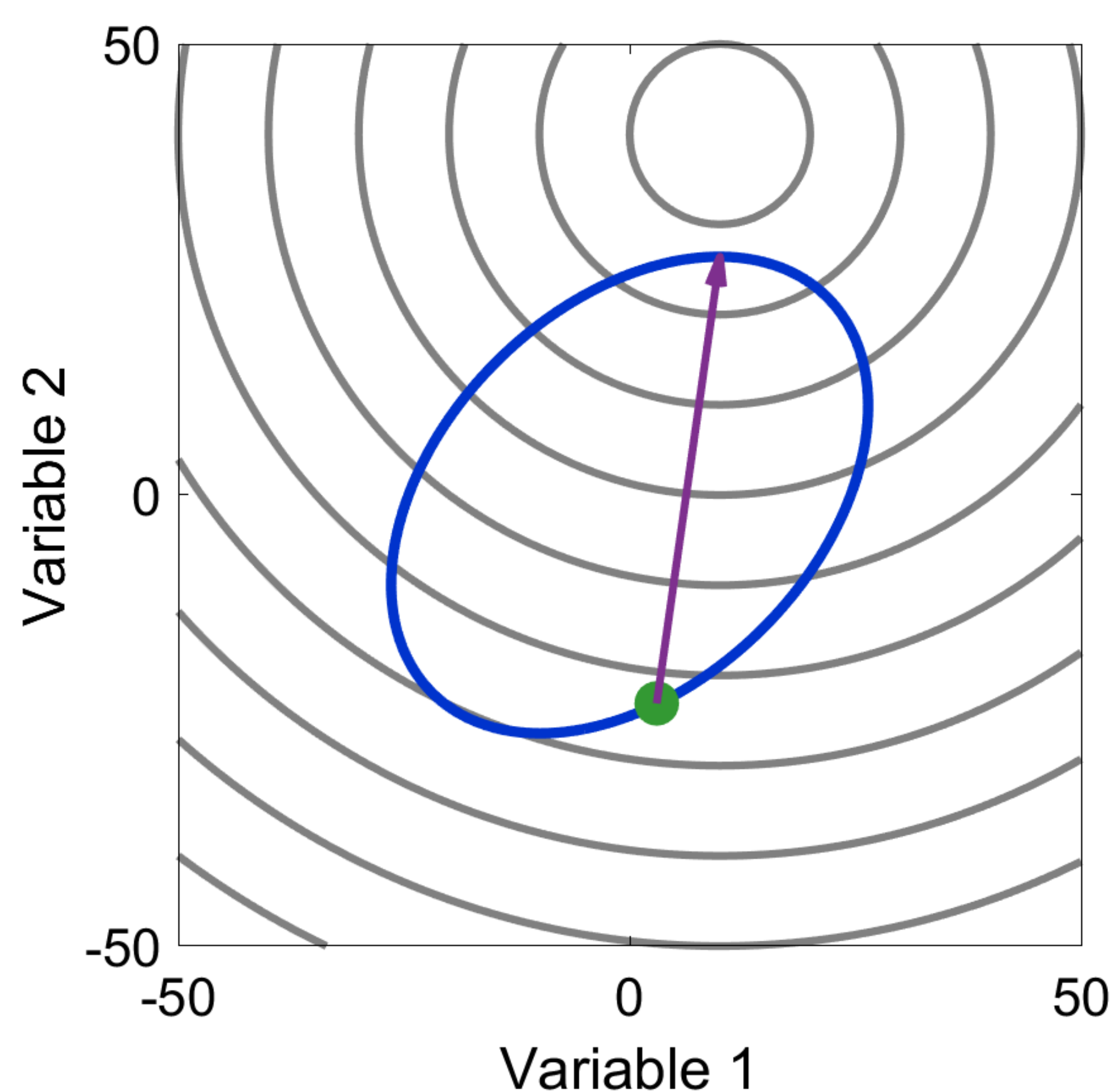


Targeted quantification

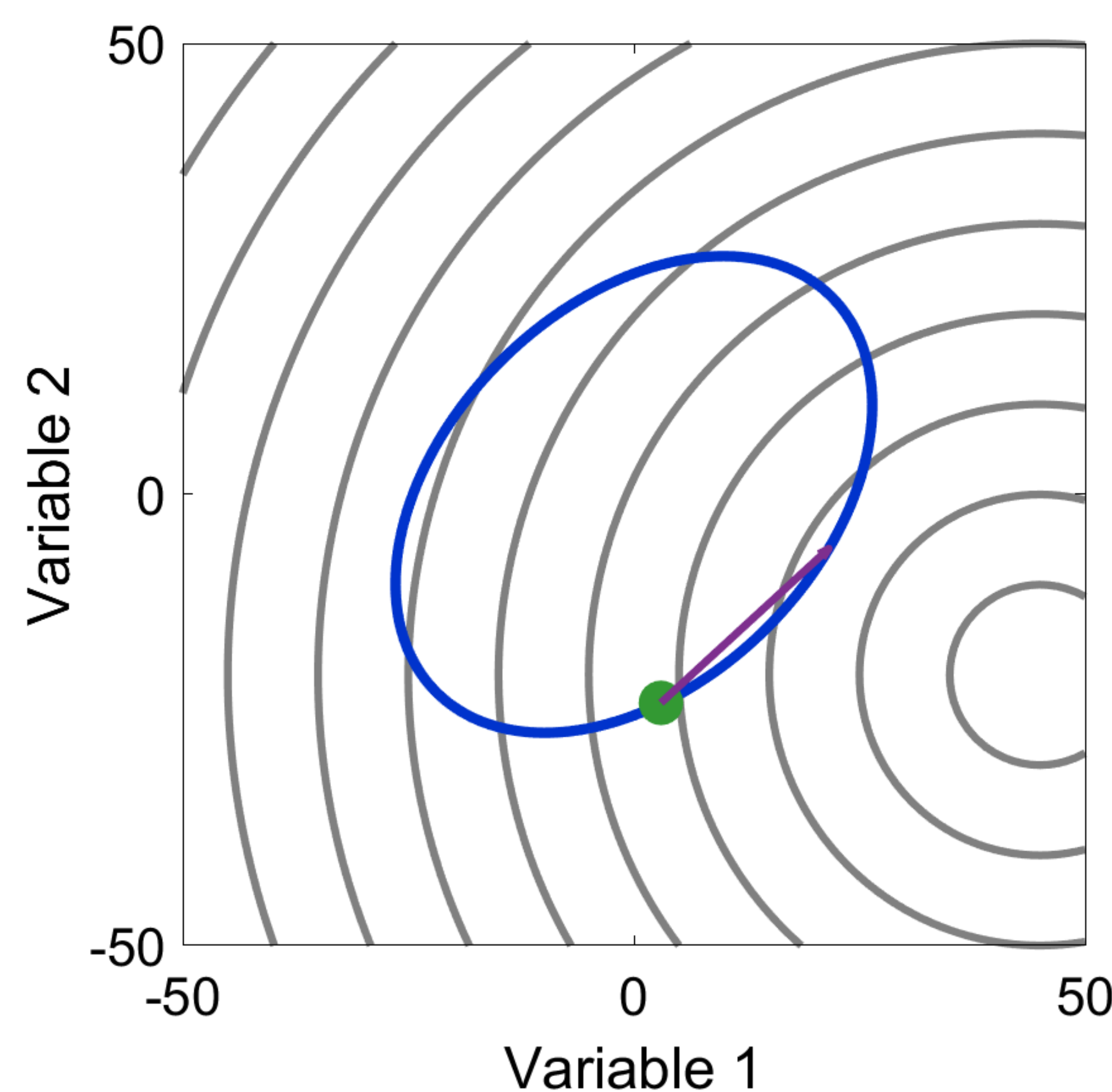
Define a function ψ quantifying an important feature of the inversion



Large uncertainty in ψ means large reductions can occur

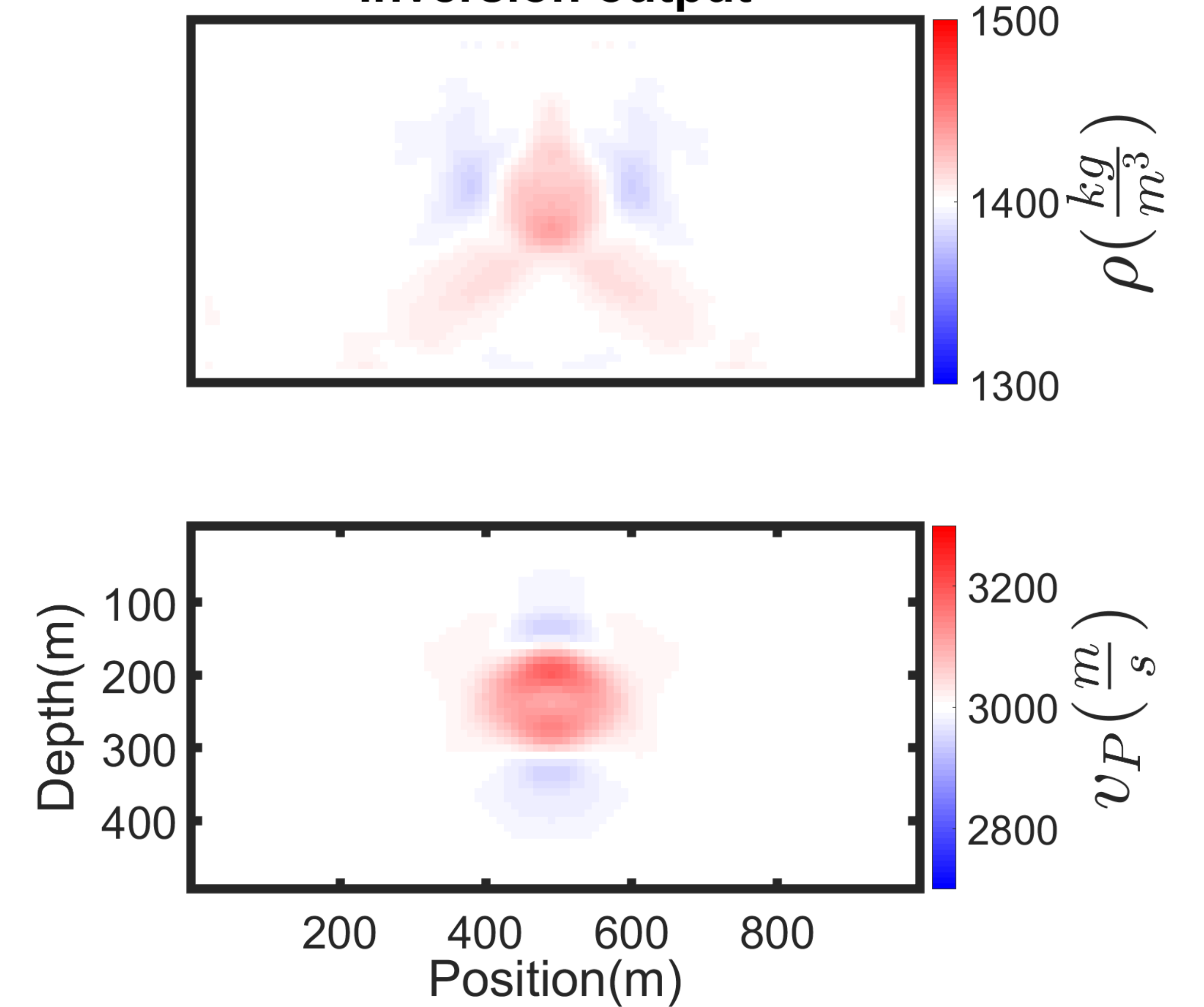


Small uncertainty in ψ means only small reductions can occur

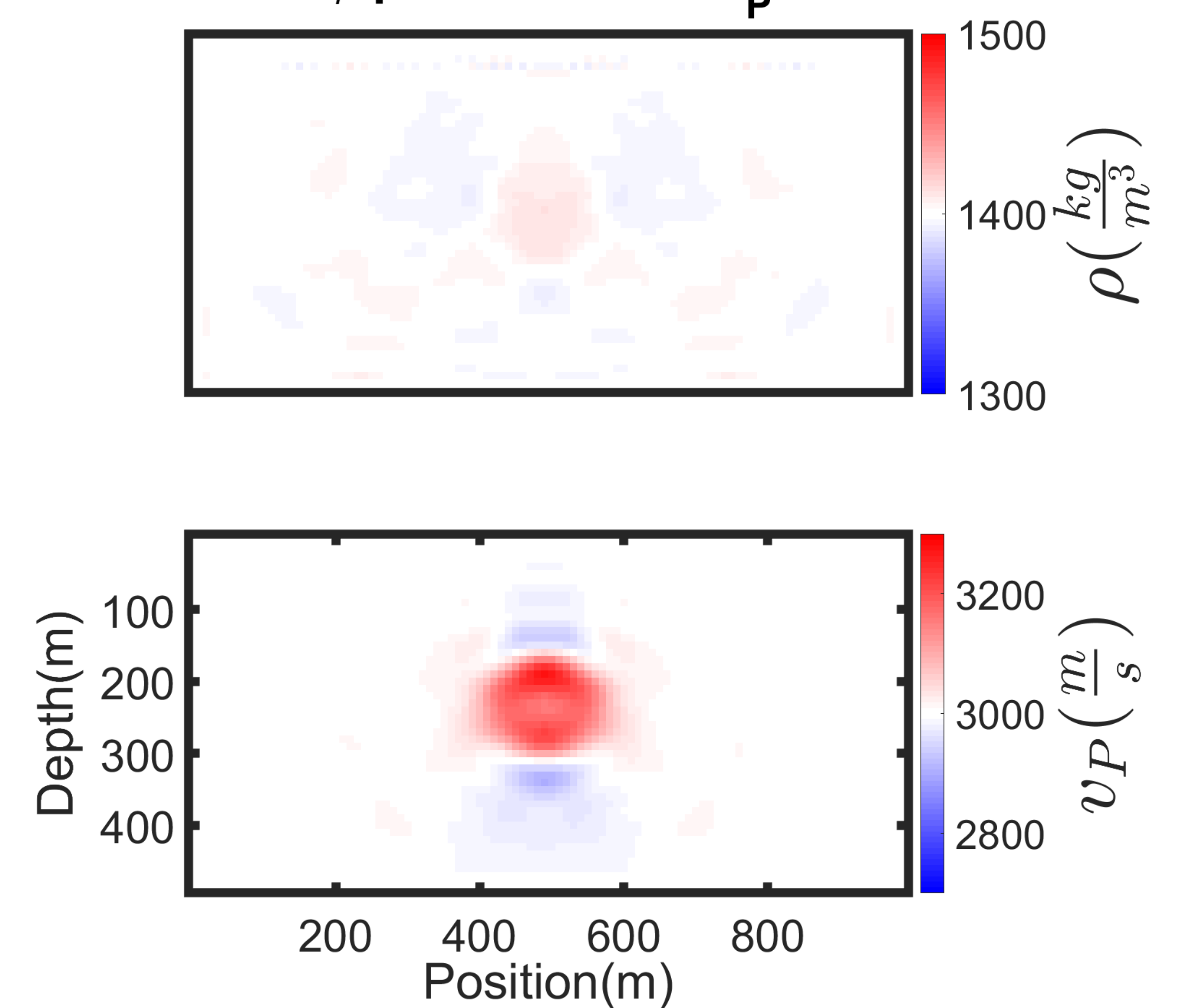


Numerical examples

Inversion output



ψ penalizes non- v_p



ψ penalizes non- ρ

