Why approximate inference?



$$p^*(z) = p(z|X) = \frac{p(X|z)p(z)}{p(X)}$$



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Easy for conjugate priors



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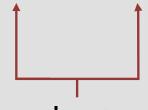
- Easy for conjugate priors
 - Hard otherwise



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- Easy for conjugate priors
 - Hard otherwise

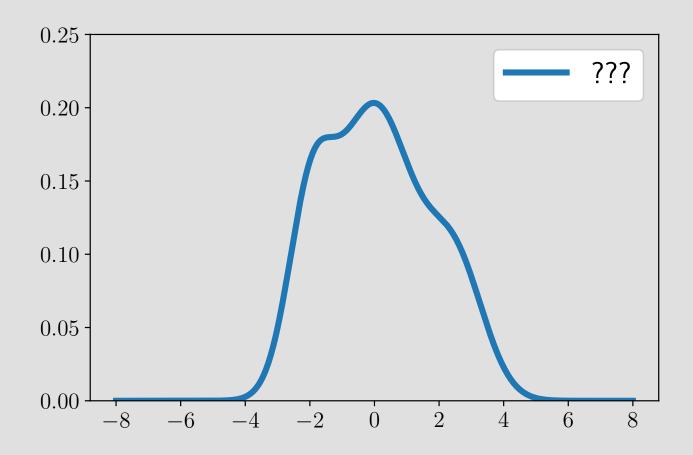
Example:
$$p(x|z) = \mathcal{N}(x|\mu(z), \sigma^2(z))$$



Neural networks



Do we need exact posterior?





Do we need exact posterior?

