

Acceptance-rejection method

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⇒ to sample from the target distribution f

The general principle is to **choose g close to f** and to propose samples from g , to accept some and reject others to get a sample following f .

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Let f be the targeted density function

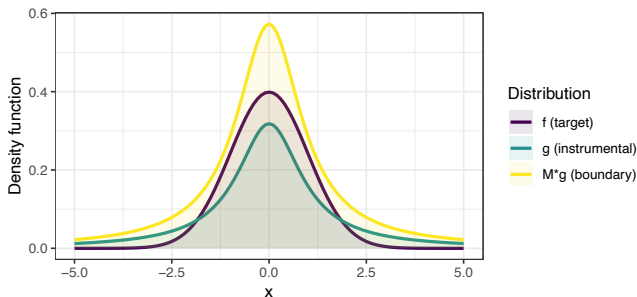
Let g be a proposal density function (from which one knows how to sample) such that, for all x : $f(x) \leq Mg(x)$

While $i \leq n$:

- 1 Sample $x_i \sim g$ and $u_i \sim \mathcal{U}_{[0,1]}$
- 2 If $u_i \leq \frac{f(x_i)}{Mg(x_i)}$, **accept** the draw:
 $y_i := x_i$
else **reject** it and return to 1.

⇒ $(y_1, \dots, y_n) \stackrel{iid}{\sim} f$

Acceptance-rejection: importance of the proposal



Example of a proposal and a target distribution for the accept-reject algorithm

Remark: The smaller M , the greater acceptance rate
 \Rightarrow the more the algorithm is efficient at sampling from f (less iterations for a sample size n)

So one wishes g the as close as possible to f !

⚠ g will necessarily have heavier tail than the target
 \Rightarrow when the number of parameters increases, acceptance rate decrease svery rapidly
(curse of dimension)