

Exercise 8. Continue with the two-dimensional target density from Exercise 7:

$$f(x, y) \propto \exp(-2x^3y^3), x \in [-1, 2], y \in [-1, 2]. \quad (1)$$

Use the component-wise version of a Metropolis-Hastings algorithm (course material Chapter 7) to generate samples from this density, i.e. each component of the vector (x, y) is updated using a separate proposal (Section 7.6, p. 82), i.e. the proposal distribution is one-dimensional in this case. Use the same type of proposal distributions as in the steps 1 & 2 in Exercise 7, but now such that they are one-dimensional (i.e. Uniform(-1,2) and univariate Normal distributions). Report the sampler behavior as in Exercise 7, and compare the results of these two approaches.