# Lecture 21: Gaussian process regression

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## Sampling from a Gaussian process

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# Sampling from a Gaussian process

$$f(\cdot) \sim GP(m(\cdot), c(\cdot,\cdot))$$

Take a finite # of input $x_{1:n} = (x_1, \dots, x_n)$

Consider the function values $f_{1:n} = (f(x_1), \dots, f(x_n))$

random vector

By definition of the GP: $f_{1:n} \sim N(m_{1:n}, C_n)$

$$m_{1:n} = \begin{pmatrix} m(x_1) \\ \vdots \\ m(x_n) \end{pmatrix}, \quad C_n = (c(x_i, x_j)) \quad n \times n$$

- Find a square root of $C_n$, e.g.

$$C_n = L_n \cdot L_n^T \quad \text{(Cholesky decomp.)}$$

- Sample $z \sim N(0_n, I_n)$
- Evaluate $f_{1:n} = m_{1:n} + L_n z$.

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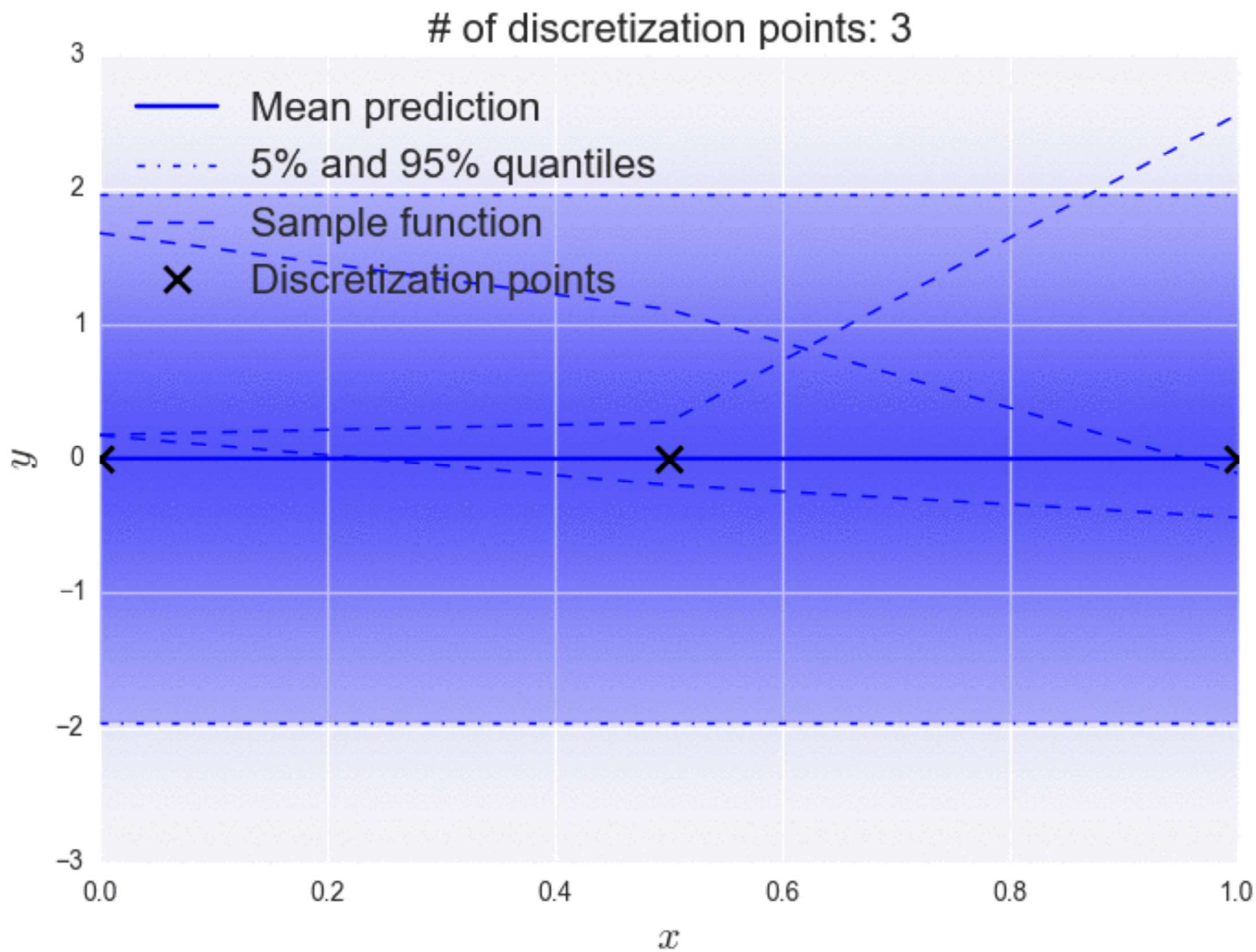


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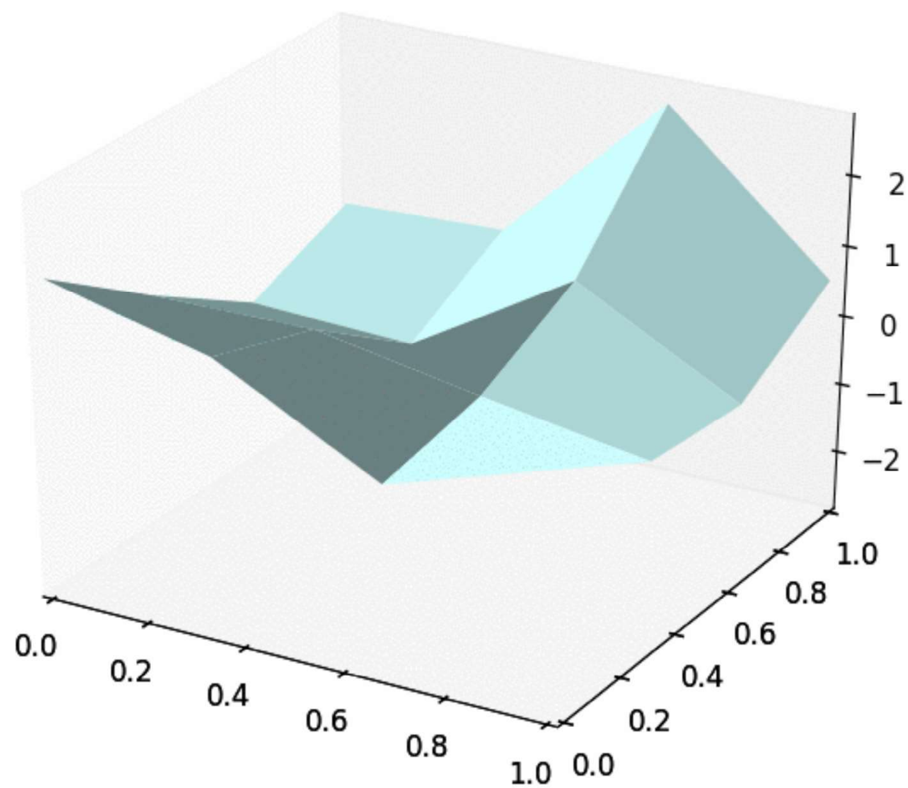


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