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# **Funsor Documentation**

*Release 0.0*

**Uber AI Labs**

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# CHAPTER 1

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## Domains

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## CHAPTER 2

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Operations

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## CHAPTER 3

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### Interpretations

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#### **3.1 Interpreter**

#### **3.2 Monte Carlo**

#### **3.3 Memoize**



**4.1 Basic Funsors**

**4.2 Delta**

**4.3 PyTorch**

**4.4 JAX**

**4.5 Gaussian**

**4.6 Joint**

**4.7 Contraction**

**4.8 Integrate**



# CHAPTER 5

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Optimizer

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## CHAPTER 6

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### Adjoint Algorithms

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# CHAPTER 7

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## Sum-Product Algorithms

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## CHAPTER 8

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### Affine Pattern Matching

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## CHAPTER 9

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### Testing Utilites

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## Pyro-Compatible Distributions

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This interface provides a number of PyTorch-style distributions that use functors internally to perform inference. These high-level objects are based on a wrapping class: `FunsorDistribution` which wraps a functor in a PyTorch-distributions-compatible interface. `FunsorDistribution` objects can be used directly in Pyro models (using the standard Pyro backend).

### 10.1 FunsorDistribution Base Class

### 10.2 Hidden Markov Models

### 10.3 Conversion Utilities





# CHAPTER 11

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## Distribution Funsors

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This interface provides a number of standard normalized probability distributions implemented as funsors.



## CHAPTER 12

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### Mini-Pyro Interface

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This interface provides a backend for the Pyro probabilistic programming language. This interface is intended to be used indirectly by writing standard Pyro code and setting `pyro_backend("functor")`. See `examples/minipyro.py` for example usage.



## CHAPTER 13

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### Einsum Interface

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This interface implements tensor variable elimination among tensors. In particular it does not implement continuous variable elimination.



## CHAPTER 14

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### Indices and tables

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