C++ How can I set the parameter of a `std::exponential_distribution` object?

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C++ Standard Library - Random Number Generation and Distributions: How can I set the parameter of the exponential distribution?

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I have a program which requires exponentially distributed random numbers. I am using the C++11 Random Numbers and Distributions Library support.

I have a distribution: `std::exponential_distribution<double> exp_dis(lambda);`

`lambda` is any value to begin with. `0.0` or `1.0` are okay values to use.

I refer to this distribution in a thread function using a pointer. (I have an independent distribution for each thread function to avoid data race conditions.)

The value of `lambda` is computed within a loop, and can change each time the loop is executed.

Therefore I would like to know how the value of the parameter `lamda` can be "set" within the exponential distribution.

From some quick searches, I think I should be able to do this using the member function `param()`, but I can't figure out the exact syntax to use.

This doesn't work:

```
// Pointer to exponential distribution object
exp_dis_p->param(lambda);
```

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2 Answers

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You can also change the `lambda` for your exponential distribution as following.

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```
template<typename T>
void set_new_lambda(std::exponential_distribution<T> *exp_dis, T val)
{
    typename std::exponential_distribution<T>::param_type new_lambda(val);
    exp_dis->param(new_lambda);
}
```

And can use it as following

```
int main()
{
  std::exponential_distribution<double> exp_dis(0.1);
  std::cout<<exp_dis.lambda()<<'\n';

  set_new_lambda(&exp_dis,0.2);

  std::cout<<exp_dis.lambda()<<'\n';
```

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```
    return 0;
}
```

Or may be if you are dealing with only double type then, you can do as following as well.

```
int main()
{
  std::exponential_distribution<double> exp_dis(0.1);
  auto ptr = &exp_dis;
  std::exponential_distribution<double>::param_type new_lambda(0.2);
  ptr->param(new_lambda);
}
```

And you can see that `param_type` for distribution can be declared as `std::exponential_distribution<double>::param_type`.

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edited Oct 27 '15 at 10:55

answered Oct 27 '15 at 4:29

jha-G
1,768 ● 10 ● 27

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With the following you should be able to set the new lambda:

0

```
decltype(exp_dis_p->param()) new_lambda (lambda);
exp_dis_p->param(new_lambda);
```

This is code I've been using since some time. Like explained by Praetorian in the comments, the param() type has the same arguments as the parent type.

I found this about it in a document about the C++ standardizing:

For each of the constructors of D taking arguments corresponding to parameters of the distribution, P shall have a corresponding constructor subject to the same requirements and taking arguments identical in number, type, and

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> default values. Moreover, for each of the member functions of D that return values corresponding to parameters of the distribution, P shall have a corresponding member function with the identical name, type, and semantics.

With D being the distribution class, and P is the type named by D's associated param_type.

The `decltype` function simply:

> Inspects the declared type of an entity or queries the type and value category of an expression.

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edited Oct 26 '15 at 16:25

answered Oct 26 '15 at 16:03

agold
5,048 ● 7 ● 33 ● 49

---

1   @user3728501 For any distribution type, the nested `param_type` type is guaranteed to be constructible using the same constructor arguments as the parent type. – Praetorian Oct 26 '15 at 16:10

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