

Complex Number Objects

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\c-api\[cpython-main] [Doc] [c-api] complex.rst, line 1)

Unknown directive type "highlight".

```
.. highlight:: c
```

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Unknown directive type "index".

```
.. index:: object: complex number
```

Python's complex number objects are implemented as two distinct types when viewed from the C API: one is the Python object exposed to Python programs, and the other is a C structure which represents the actual complex number value. The API provides functions for working with both.

Complex Numbers as C Structures

Note that the functions which accept these structures as parameters and return them as results do so *by value* rather than dereferencing them through pointers. This is consistent throughout the API.

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Unknown directive type "c.type".

```
.. c:type:: Py_complex
```

The C structure which corresponds to the value portion of a Python complex number object. Most of the functions for dealing with complex number objects use structures of this type as input or output values, as appropriate. It is defined as::

```
typedef struct {
    double real;
    double imag;
} Py_complex;
```

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Unknown directive type "c.function".

```
.. c:function:: Py_complex _Py_c_sum(Py_complex left, Py_complex right)
```

Return the sum of two complex numbers, using the C :c:type:`Py_complex` representation.

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Unknown directive type "c.function".

```
.. c:function:: Py_complex _Py_c_diff(Py_complex left, Py_complex right)
```

Return the difference between two complex numbers, using the C :c:type:`Py_complex` representation.

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Unknown directive type "c:function".

```
.. c:function:: Py_complex _Py_c_neg(Py_complex num)

Return the negation of the complex number *num*, using the C
:c:type:`Py_complex` representation.
```

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Unknown directive type "c:function".

```
.. c:function:: Py_complex _Py_c_prod(Py_complex left, Py_complex right)

Return the product of two complex numbers, using the C :c:type:`Py_complex`
representation.
```

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Unknown directive type "c:function".

```
.. c:function:: Py_complex _Py_c_quot(Py_complex dividend, Py_complex divisor)

Return the quotient of two complex numbers, using the C :c:type:`Py_complex`
representation.

If *divisor* is null, this method returns zero and sets
:c:data:`errno` to :c:data:`EDOM`.
```

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Unknown directive type "c:function".

```
.. c:function:: Py_complex _Py_c_pow(Py_complex num, Py_complex exp)

Return the exponentiation of *num* by *exp*, using the C :c:type:`Py_complex`
representation.

If *num* is null and *exp* is not a positive real number,
this method returns zero and sets :c:data:`errno` to :c:data:`EDOM`.
```

Complex Numbers as Python Objects

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Unknown directive type "c:type".

```
.. c:type:: PyComplexObject

This subtype of :c:type:`PyObject` represents a Python complex number object.
```

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Unknown directive type "c:var".

```
.. c:var:: PyTypeObject PyComplex_Type

This instance of :c:type:`PyTypeObject` represents the Python complex number
```

type. It is the same object as `:class:`complex`` in the Python layer.

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Unknown directive type "c:function".

```
.. c:function:: int PyComplex_Check(PyObject *p)
```

Return true if its argument is a `:c:type:`PyComplexObject`` or a subtype of `:c:type:`PyComplexObject``. This function always succeeds.

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Unknown directive type "c:function".

```
.. c:function:: int PyComplex_CheckExact(PyObject *p)
```

Return true if its argument is a `:c:type:`PyComplexObject``, but not a subtype of `:c:type:`PyComplexObject``. This function always succeeds.

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Unknown directive type "c:function".

```
.. c:function:: PyObject* PyComplex_FromCComplex(Py_complex v)
```

Create a new Python complex number object from a C `:c:type:`Py_complex`` value.

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Unknown directive type "c:function".

```
.. c:function:: PyObject* PyComplex_FromDoubles(double real, double imag)
```

Return a new `:c:type:`PyComplexObject`` object from `*real*` and `*imag*`.

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Unknown directive type "c:function".

```
.. c:function:: double PyComplex_RealAsDouble(PyObject *op)
```

Return the real part of `*op*` as a C `:c:type:`double``.

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Unknown directive type "c:function".

```
.. c:function:: double PyComplex_ImagAsDouble(PyObject *op)
```

Return the imaginary part of `*op*` as a C `:c:type:`double``.

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Unknown directive type "c:function".

```
.. c:function:: Py_complex PyComplex_AsCComplex(PyObject *op)
```

Return the `:c:type:`Py_complex`` value of the complex number `*op*`.

If `*op*` is not a Python complex number object but has a `:meth:`__complex__`` method, this method will first be called to convert `*op*` to a Python complex number object. If ``__complex__()`` is not defined then it falls back to `:meth:`__float__``. If ``__float__()`` is not defined then it falls back to `:meth:`__index__``. Upon failure, this method returns ``-1.0`` as a real value.

```
.. versionchanged:: 3.8
```

Use `:meth:`__index__`` if available.