

# assertion

November 7, 2023

This file is part of CasADi.

CasADi -- A symbolic framework for dynamic optimization.  
Copyright (C) 2010–2023 Joel Andersson, Joris Gillis, Moritz Diehl,  
KU Leuven. All rights reserved.  
Copyright (C) 2011–2014 Greg Horn

CasADi is free software; you can redistribute it and/or  
modify it under the terms of the GNU Lesser General Public  
License as published by the Free Software Foundation; either  
version 3 of the License, or (at your option) any later version.

CasADi is distributed in the hope that it will be useful,  
but WITHOUT ANY WARRANTY; without even the implied warranty of  
MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the GNU  
Lesser General Public License for more details.

You should have received a copy of the GNU Lesser General Public  
License along with CasADi; if not, write to the Free Software  
Foundation, Inc., 51 Franklin Street, Fifth Floor, Boston, MA 02110-1301 USA

```
[1]: from casadi import *
```

CasADi provides a mechanism to add assertions in an MX expression graph. This can be useful to debug your code, e.g. debugging why the end-result of a computation yields NaN.

Consider this example:

```
[2]: x = MX.sym("x")  
     y = sin(x)  
     z = sqrt(y)
```

```
[3]: f = Function("f", [x], [z])
```

```
[4]: z0 = f(5)
```

```
[5]: print(z0)
```

-nan

For some mysterious reason we get NaN here

Next, we add an assertion:

```
[6]: y = y.attachAssert(y>0, "bummer") # Add assertion here
     z = sqrt(y)
```

```
[7]: f = Function("f", [x],[z])
```

```
[8]: try:
     z0 = f(5)
     except Exception as e:
         print("An exception was raised here:")
         print(e)
```

An exception was raised here:

Error in Function::call for 'f' [MXFunction] at

.../casadi/core/function.cpp:330:

.../casadi/core/assertion.cpp:70: Assertion error: bummer

You can combine this with Callback to do powerful assertions

```
[9]: class Dummy(Callback):
     def __init__(self, name, opts={}):
         Callback.__init__(self)
         self.construct(name, opts)
     def get_n_in(self): return 1
     def get_n_out(self): return 1
     def eval(self, arg):
         import numpy
         x = arg[0]
         m = max(numpy.real(numpy.linalg.eig(blockcat([[x,-1],[-1,2]]))[0]))
         print("m=",m)
         return [int(m>2)]
```

```
[10]: foo = Dummy("foo")
```

```
[11]: y = sin(x)
```

```
[12]: y = y.attachAssert(foo(y), "you are in trouble") # Add assertion here
     z = sqrt(y)
```

```
[13]: f = Function("f", [x],[z])
```

```
[14]: z0 = f(5)
```

m= 2.3062613059254473