

GammaLib - Bug #3541

csspec aborts if there is an energy bin with 0 observed/predicted events

02/17/2021 10:43 AM - Tibaldo Luigi

Status:	Closed	Start date:	02/17/2021
Priority:	Urgent	Due date:	
Assigned To:	Knödlseher Jürgen	% Done:	100%
Category:		Estimated time:	0.00 hour
Target version:	2.0.0		

Description

This issue was reported by Marianne, here's an extract from the debug output

```
2021-02-16T16:27:33: +=====+
2021-02-16T16:27:33: | Input observation |
2021-02-16T16:27:33: +=====+
2021-02-16T16:27:33: === GObservations ===
2021-02-16T16:27:33: Number of observations ....: 1
2021-02-16T16:27:33: Number of models .....: 2
2021-02-16T16:27:33: Number of observed events ..: 0
2021-02-16T16:27:33: Number of predicted events : 0
2021-02-16T16:27:33:
2021-02-16T16:27:33: +=====+
2021-02-16T16:27:33: | Maximum likelihood optimisation |
2021-02-16T16:27:33: +=====+
terminate called after throwing an instance of 'GException::empty'
what(): *** ERROR in GMatrixSparse::GMatrixSparse(int&, int&, int&): Zero-size allocation.
Aborted
```

A likelihood fit can certainly not work with 0 observed and predicted events, we should add a check and skip bins for which this situation occurs.

History

#1 - 05/07/2021 11:04 PM - Knödlseher Jürgen

- Priority changed from Normal to High
- Target version set to 2.0.0

I have this same error recently quite often, not sure why it did not show up before.

#2 - 05/10/2021 08:01 AM - Knödlseher Jürgen

- Status changed from New to In Progress
- Assigned To set to Knödlseher Jürgen
- % Done changed from 0 to 10

I modified the

```
GMatrixSparse::GMatrixSparse(const int& rows, const int& columns, const int& elements)
```

constructor so that it allows also zero number of rows or columns. This was a todo that was identified. Nevertheless, I need to check that the sparse matrix class allows to operate on empty matrices. I did the same in the GMatrix and GMatrixSymmetric class.

#3 - 05/10/2021 08:36 AM - Knödseder Jürgen

It seems that the sparse matrix class is not yet working properly on empty matrices:

```
0 libgamma.8.dylib      0x0000000107e9e6b9 cs_transpose(GMatrixSparse const&, int) + 121 (GMatrixSparse.cpp:3810)
1 libgamma.8.dylib      0x0000000107e9e5d0 GMatrixSparse::transpose() const + 224
```

#4 - 05/10/2021 11:13 AM - Knödseder Jürgen

- *Project changed from ctools to GammaLib*
- *Target version deleted (2.0.0)*
- *% Done changed from 10 to 30*

I added unit tests to verify that all methods and operators of GMatrixSparse work seamlessly on empty matrices. This needed a few code adaptations.

I still need to do the same for the other two storage classes.

#5 - 05/10/2021 11:14 AM - Knödseder Jürgen

- *Target version set to 2.0.0*

#6 - 05/10/2021 12:34 PM - Knödseder Jürgen

- *Status changed from In Progress to Pull request*
- *% Done changed from 30 to 90*

I implement unit tests also for all other storage classes. Things seem to work well now.

In addition, I modified the code in GObservation and GResponse so that no issues occur in case that there are no events. I tested the code on cssens where I had the same error before and now it works fine.

#7 - 05/10/2021 01:56 PM - Knödseder Jürgen

- *Status changed from Pull request to Closed*
- *% Done changed from 90 to 100*

The code was merged into devel.

#8 - 05/10/2021 05:21 PM - Knödseder Jürgen

- *Status changed from Closed to In Progress*
- *Priority changed from High to Urgent*
- *% Done changed from 100 to 50*

There seems still to be a problem when passing an observation without any event. Such a problem occurs in the csphasecrv unit test.

#9 - 05/11/2021 10:39 PM - Knödseder Jürgen

- *Status changed from In Progress to Pull request*
- *% Done changed from 50 to 90*

Found it. It was an exception in `GMatrixSparse::stack_push_column()` that I moved and that I shouldn't. I fixed the issue.

#10 - 05/12/2021 07:18 AM - Knödseder Jürgen

- *Status changed from Pull request to Closed*
- *% Done changed from 90 to 100*

The code was merged into devel.