

GammaLib - Bug #3563

Fix spare matrix flushing issue

03/11/2021 12:23 AM - Knödlseider Jürgen

Status:	Closed	Start date:	03/11/2021
Priority:	Immediate	Due date:	
Assigned To:	Knödlseider Jürgen	% Done:	100%
Category:		Estimated time:	0.00 hour
Target version:	2.0.0		

Description

While running a model fit I encountered a crash that occurred in the `GMatrixSparse::stack_flush()` method. Enabling debugging of the method I recognised that the number of added elements did not correspond to the expected number of elements. An example output is shown below:

```
GMatrixSparse::stack_flush
Number of stack entries .: 416
Number of stack elements : 3744
Number of matrix elements: 1262
New elements .....: 0
Added elements .....: 1772 (should be 1262)
- Matrix only .....: 1691
- Stack only .....: 0
- Matrix & Stack .....: 72
```

This looks like a quite serious issue, not clear why it has not shown up earlier.

History

#1 - 03/11/2021 07:50 AM - Knödlseider Jürgen

- Status changed from New to In Progress
- % Done changed from 0 to 90

The issues was due to an incompatibility between the methods `GMatrixSparse::mix_column_prepare()` and `GMatrixSparse::mix_column()`.

The first method is used in `GMatrixSparse::stack_flush()` to estimate the number of elements that should be added to the matrix in case that a column should be mixed with the stack. This estimate is the used to allocate memory, and `GMatrixSparse::mix_column()` is then used to perform the actual mix.

In case that there is only a single element in the stack or the matrix and if that single element was in the same row, `GMatrixSparse::mix_column_prepare()` underestimated the number of elements to mix. This probably not always led to a problem since some margin is added when allocating the memory. However when this margin is exceeded, a segmentation fault will occur.

I corrected `GMatrixSparse::mix_column_prepare()` so that this special case does not occur, and the algorithm is identical to the one used in `GMatrixSparse::mix_column()`.

Tests now show always:

```
GMatrixSparse::stack_flush
Number of columns on stack : 404
Number of elements on stack: 3636
Number of matrix elements .: 1600
Col.start at end of matrix : 1600
Valid columns on stack ....: 9
Valid elements on stack ...: 0
Added elements .....: 1600 (should be 1600)
- Matrix only .....: 1519
- Stack only .....: 0
- Matrix & Stack .....: 81
```

#2 - 03/11/2021 10:13 AM - Knödseder Jürgen

- *Status changed from In Progress to Closed*

- *% Done changed from 90 to 100*

Merged into devel.