Documentation of the STAR-FTPC Clusterfinder

source code

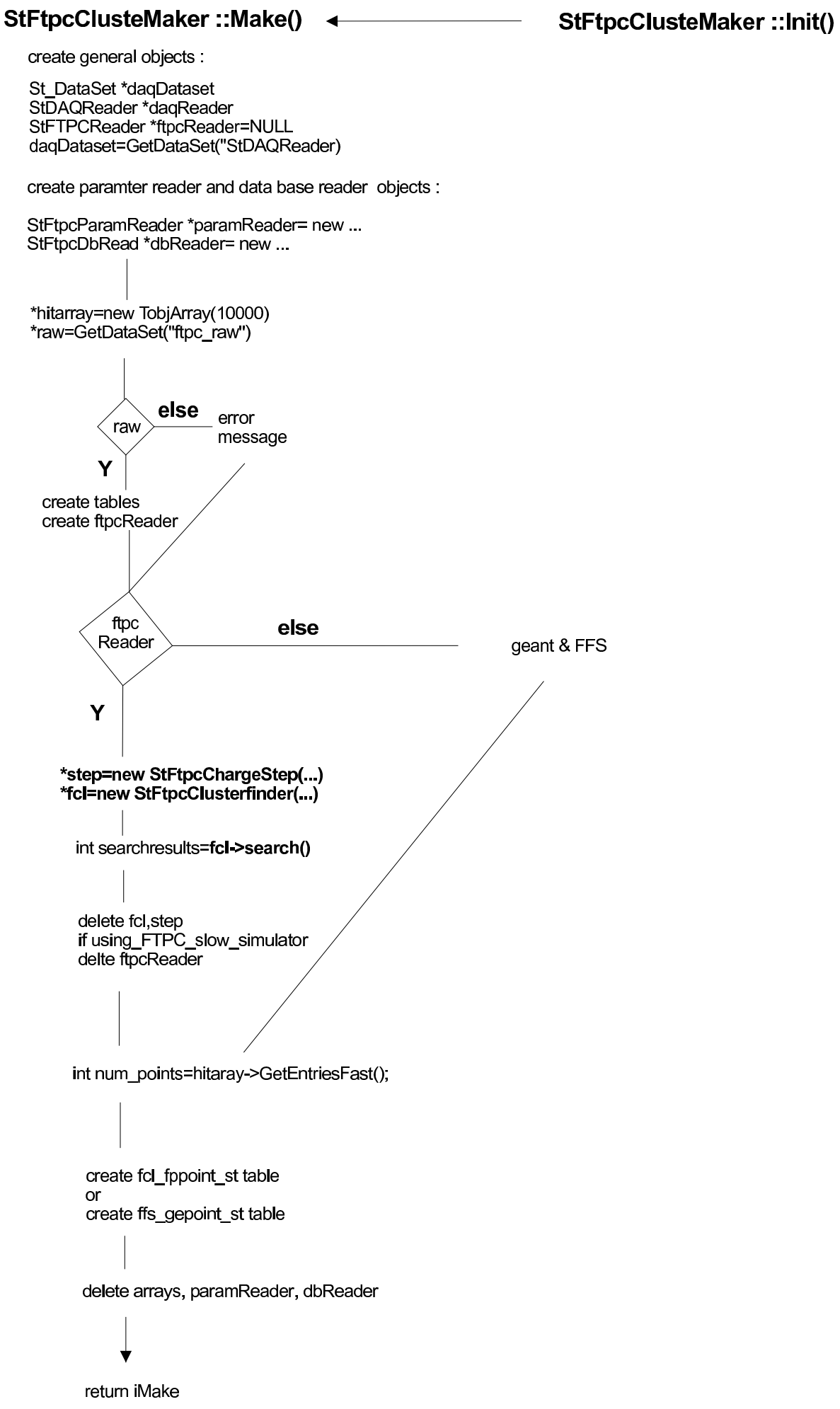
Important structures and constants :

```
#define TRUE 1
#define FALSE 0
#define MAXNUMSEQUENCES 160
#define MAXSEQPEAKS 160
#define MAXPEAKS 160
#define MAXNUMCUC 128
#define MAXLOOPS 100
#define MAXFASTLOOPS 30
#define UNFOLDLIMIT 0.01
#define UNFOLDFAILEDLIMIT 0.50


typedef struct tagClusterUC
{
  int                 StartPad;
  int                 EndPad;
  int                 NumSequences;
  int                 CutOff;
  TPCSequence   Sequence[MAXNUMSEQUENCES];
  int                 SequencePad[MAXNUMSEQUENCES];
  struct tagClusterUC* NextClusterUC;
  int                  MemoryPtr;
}TClusterUC;

typedef struct
{
  int Timebin;
  TPCSequence  Sequence;
  int  height;
  int  slope;
  int  width;
}TPadPeak;

typedef struct
{
  int  pad;
  int  Timebin;
  int  pad_saved;
  int  Timebin_saved;
  TPCSequence  Sequence;
  float TimePosition;
  float PadPosition;
  float PeakHeight;
  float OldTimePosition;
  float OldPadPosition;
  float OldPeakHeight;
  float TimeSigma;
  float PadSigma;
  float Rad;
  float Phi;
  float x;
  float y;
  float z;
}TPeak;

typedef struct TPCSequence
{
  unsigned short startTimeBin;
  unsigned short Length;
  unsigned char *FirstAdc;
}TPCSequence;
```

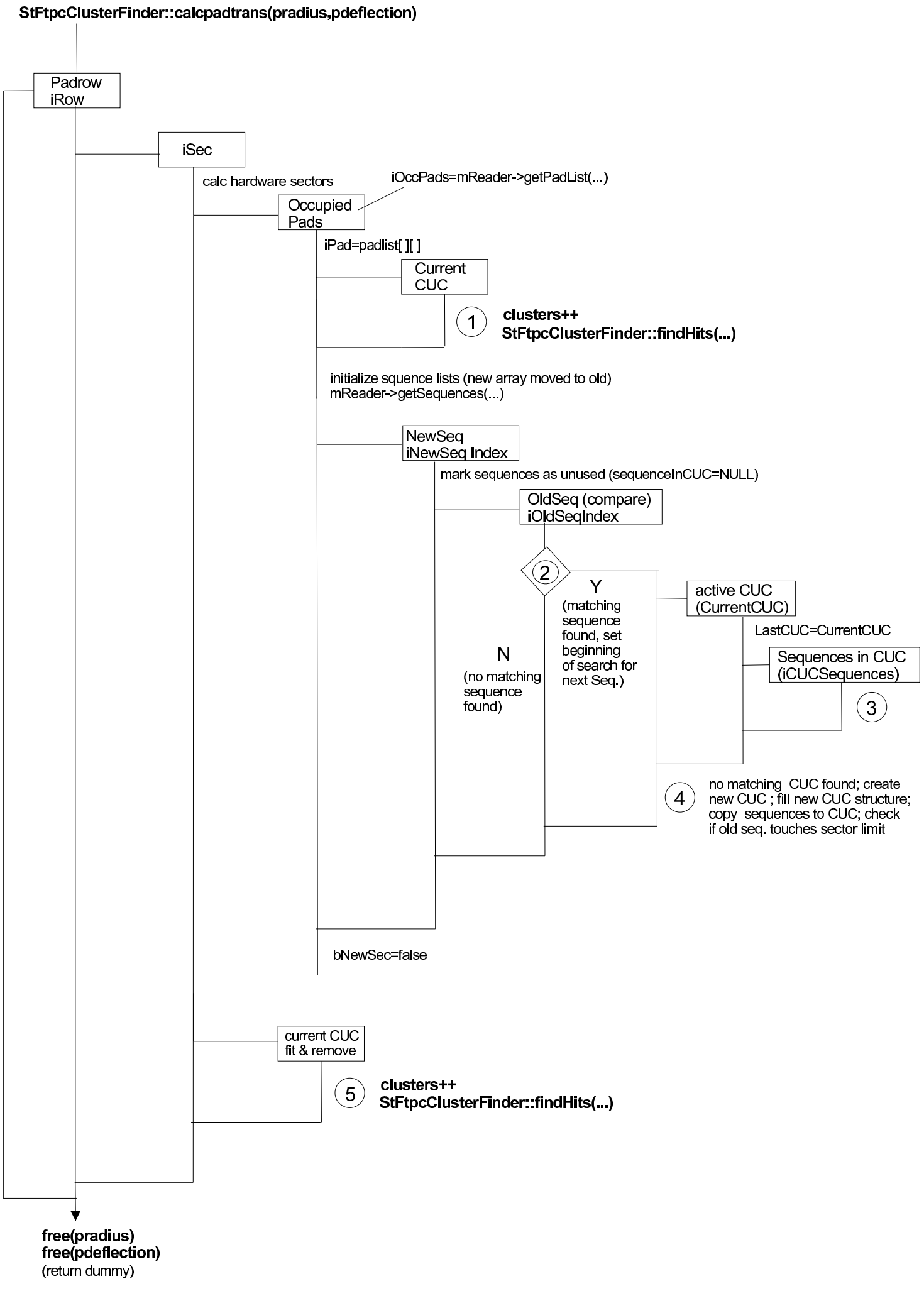
Class definitions :

```
class StFtpcClusterFinder
{

 private:

  TPCSequence test;
  TObjArray *mPoint;
  StFTPCReader *mReader;
  StFtpcParamReader *mParam;
  StFtpcDbReader *mDb;

 public:

  StFtpcClusterFinder(StFTPCReader *reader,
                      StFtpcParamReader *paramReader,
                      StFtpcDbReader    *dbReader,
                      TObjArray *pointarray);
  ~StFtpcClusterFinder();

  int search();
  int findHits(TClusterUC *Cluster, int, int, double*, double*, float *);!
  int getSeqPeaksAndCalibAmp(TPCSequence*, int, int, int, TPadPeak*, int*);
  int fitPoints(TClusterUC*, int, int, double*, double*, TPeak*, int, float*);
  int padtrans(TPeak*, int, int, double*, double*);
  float gauss_2d(int, int, float, float, float, float, float);
  float sigmax(float);
  float sigmat(float);
  int calcpadtrans(double*, double*);
  int cucInit(TClusterUC*, int*, int*);
  TClusterUC *cucAlloc(TClusterUC*, int*, int*);
  int cucFree(TClusterUC*, int*, int*, TClusterUC*);

};
```

StFtpcClusteMaker (main program) :

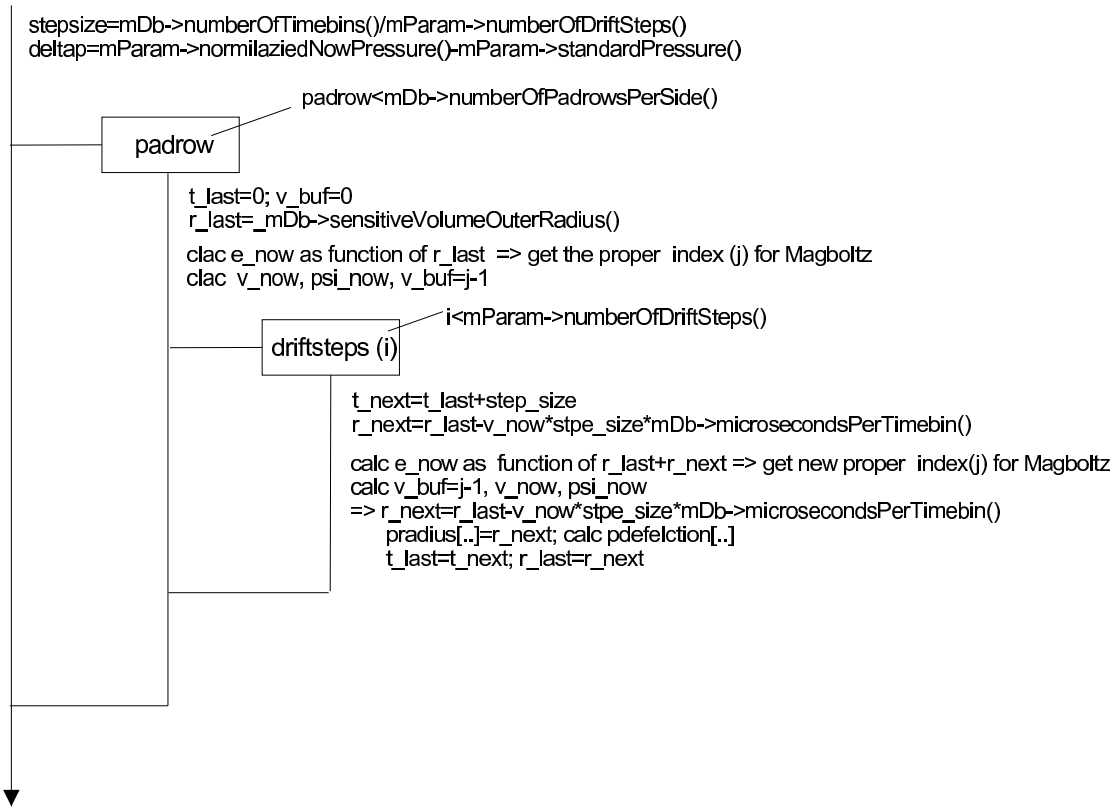


StFtpcClusterFinder::search()

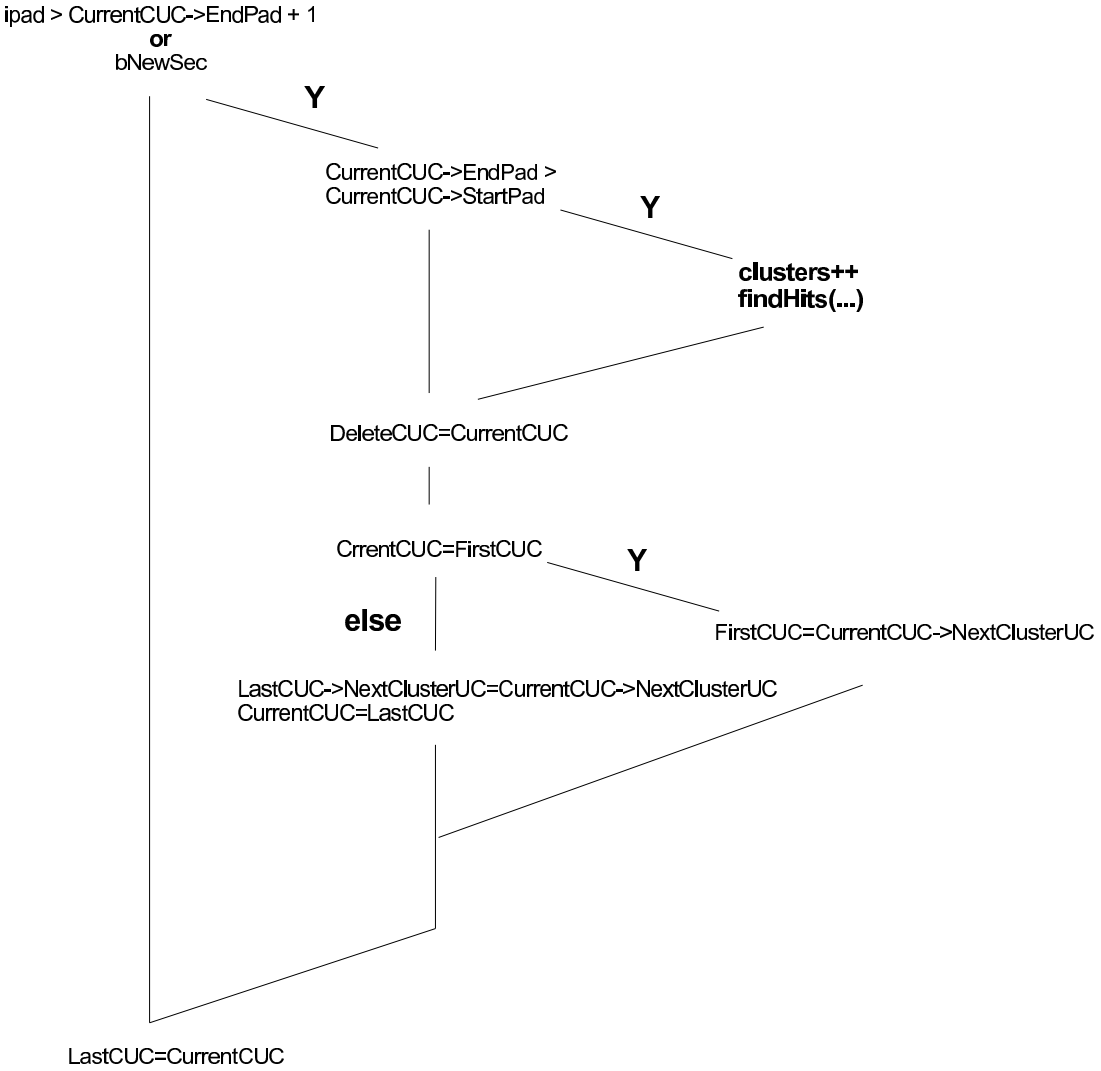


StFtpcClusterFinder::calcpadtrans(...)

::calcpadtrans(double *pradius, double *pdeflection)



1 StFtpcClusterFinder::search()



2 StFtpcClusterFinder::search()

NewSeq[].startTimeBin >= OldSeq[].startTimebin
&
NewSeq[].startTimebin <= (Oldseq[].startTimebin+OldSeq[].Length-1)

or

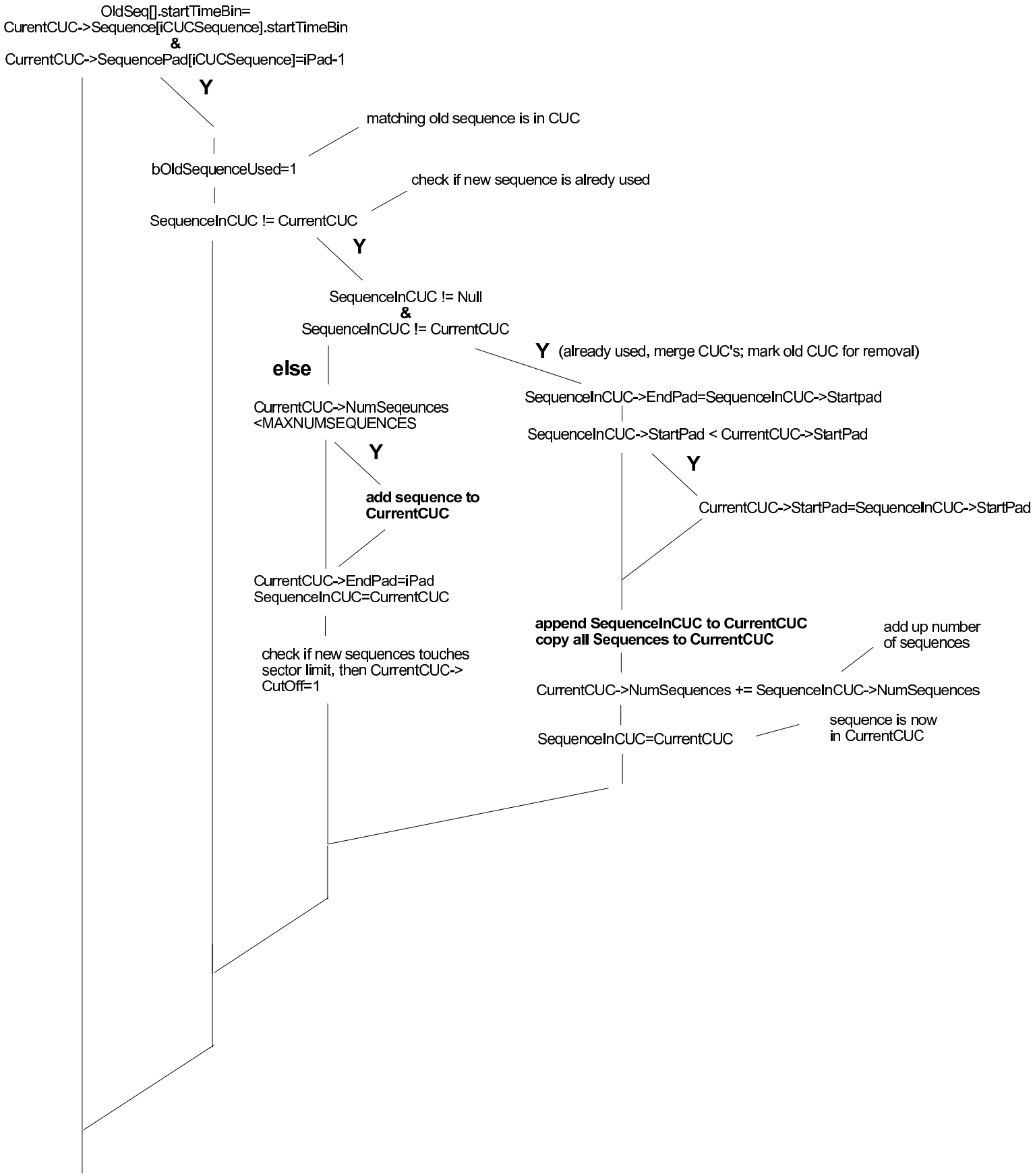
(NewSeq[].startTimeBin+NewSeq.Lenght-1) >= OldSeq[].startTimeBin
&
(NewSeq[].startTimeBin+NewSeq.Lenght-1) <= (Oldseq[].startTimebin+OldSeq[].Length-1)

or

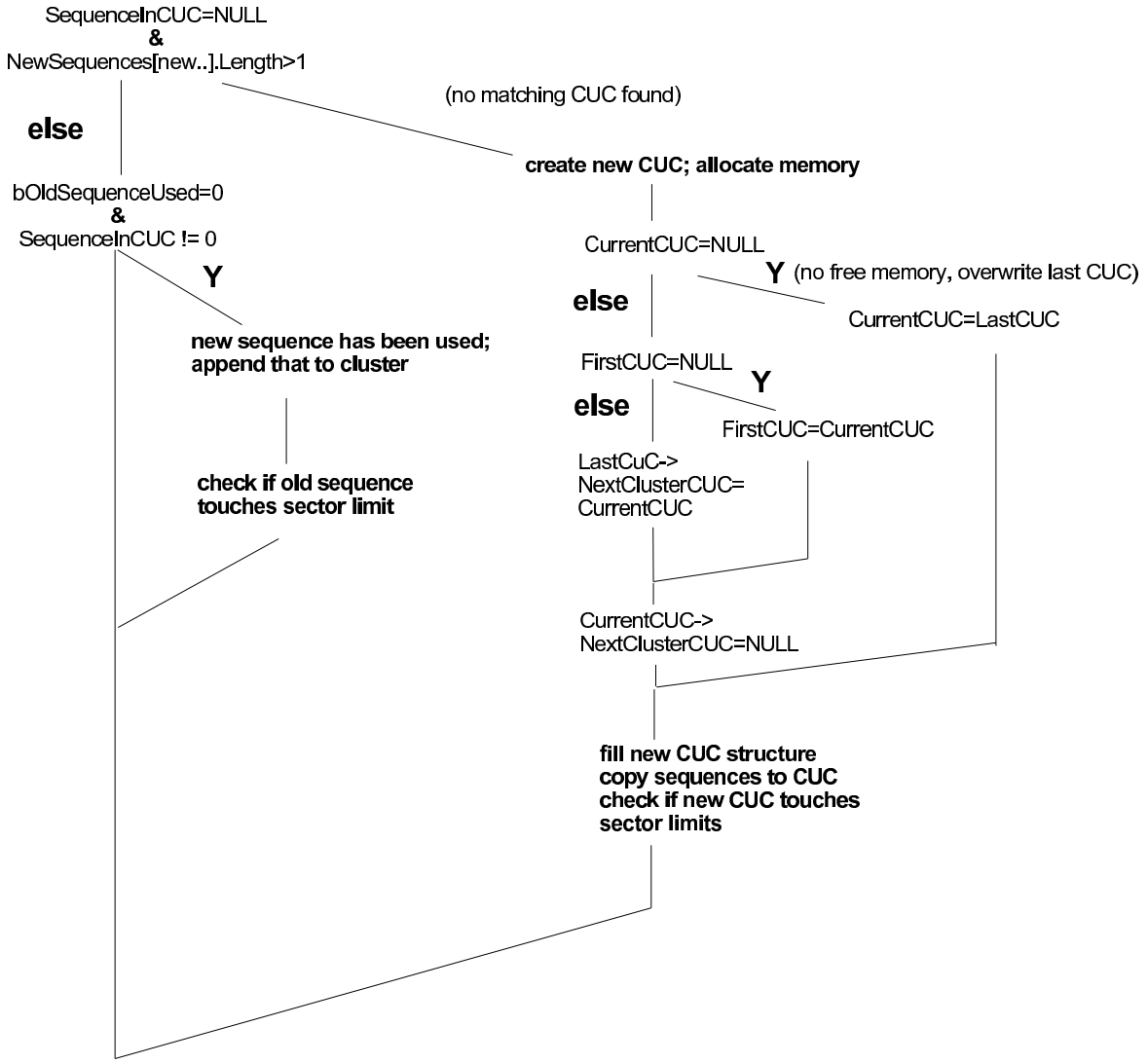
OldSeq[].startTimeBin >= NewSeq[].startTimeBin
&
OldSeq[].startTimeBin <= **(**NewSeq[].startTimeBin+NewSeq.Lenght-1)

(return true or false)

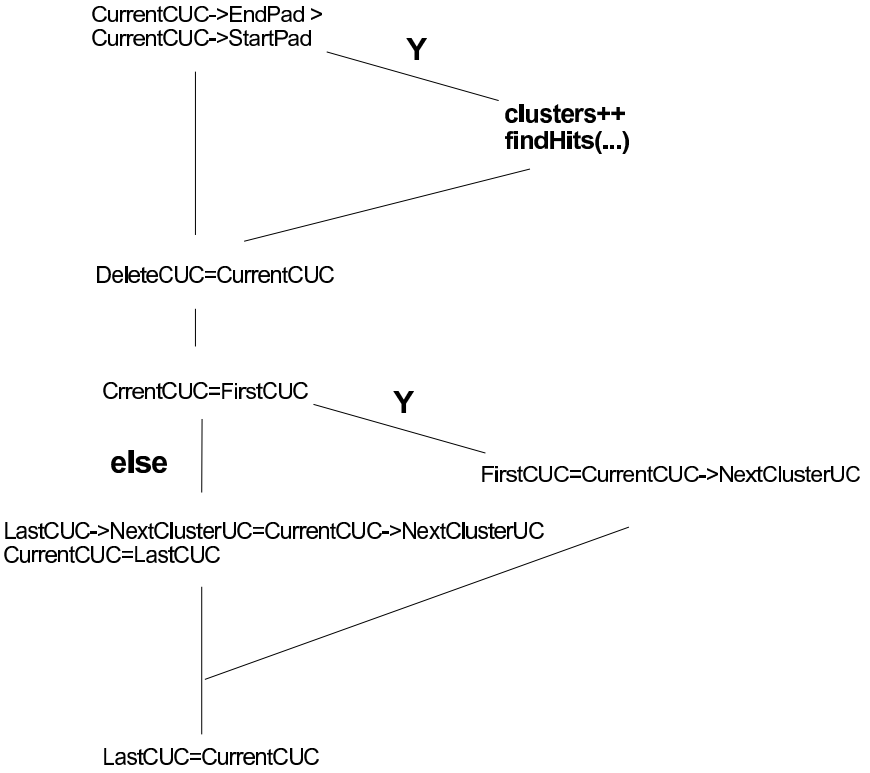
3 StFtpcClusterFinder::search()



4 StFtpcClusterFinder::search()

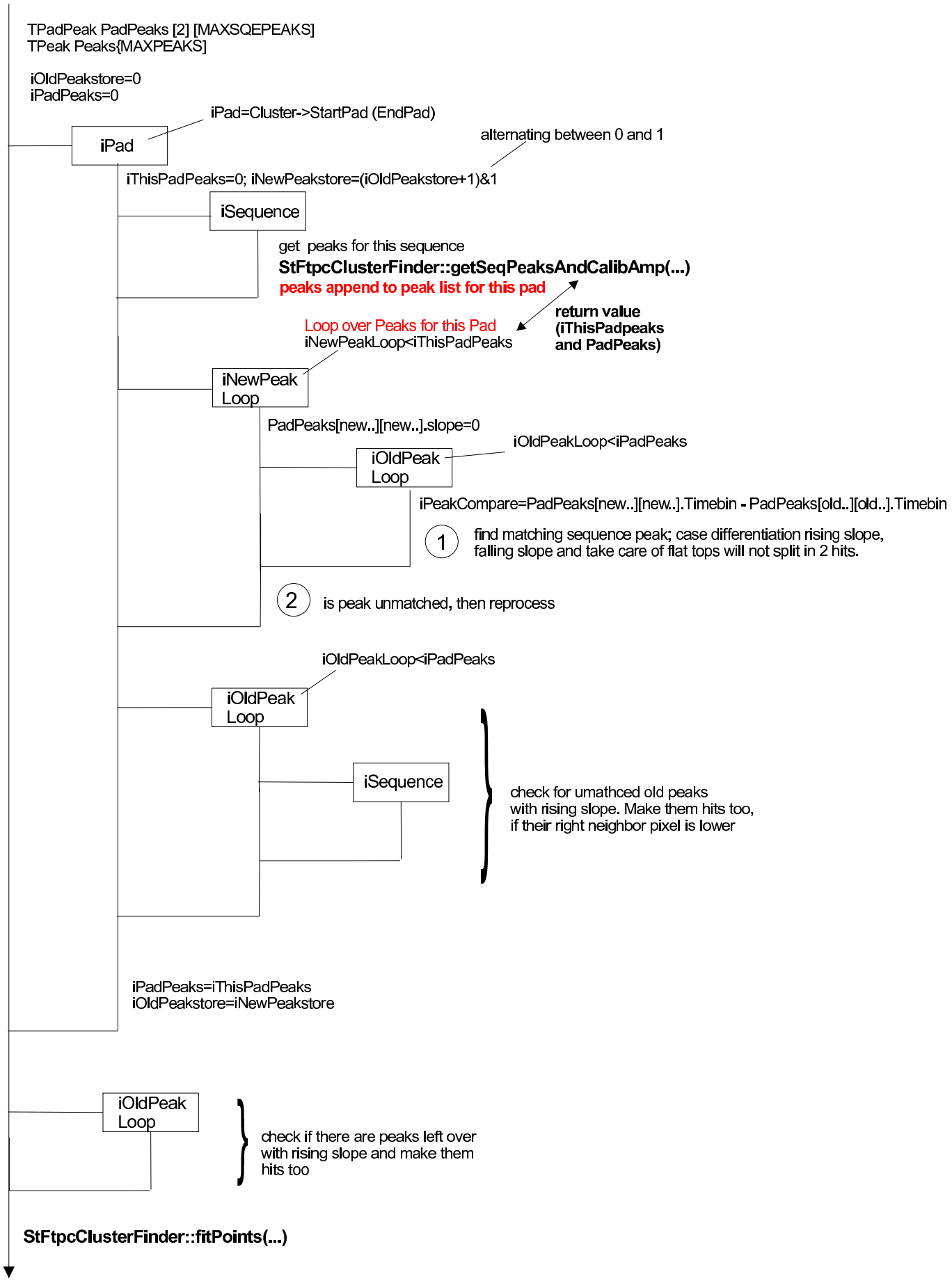


5 StFtpcClusterFinder::search()



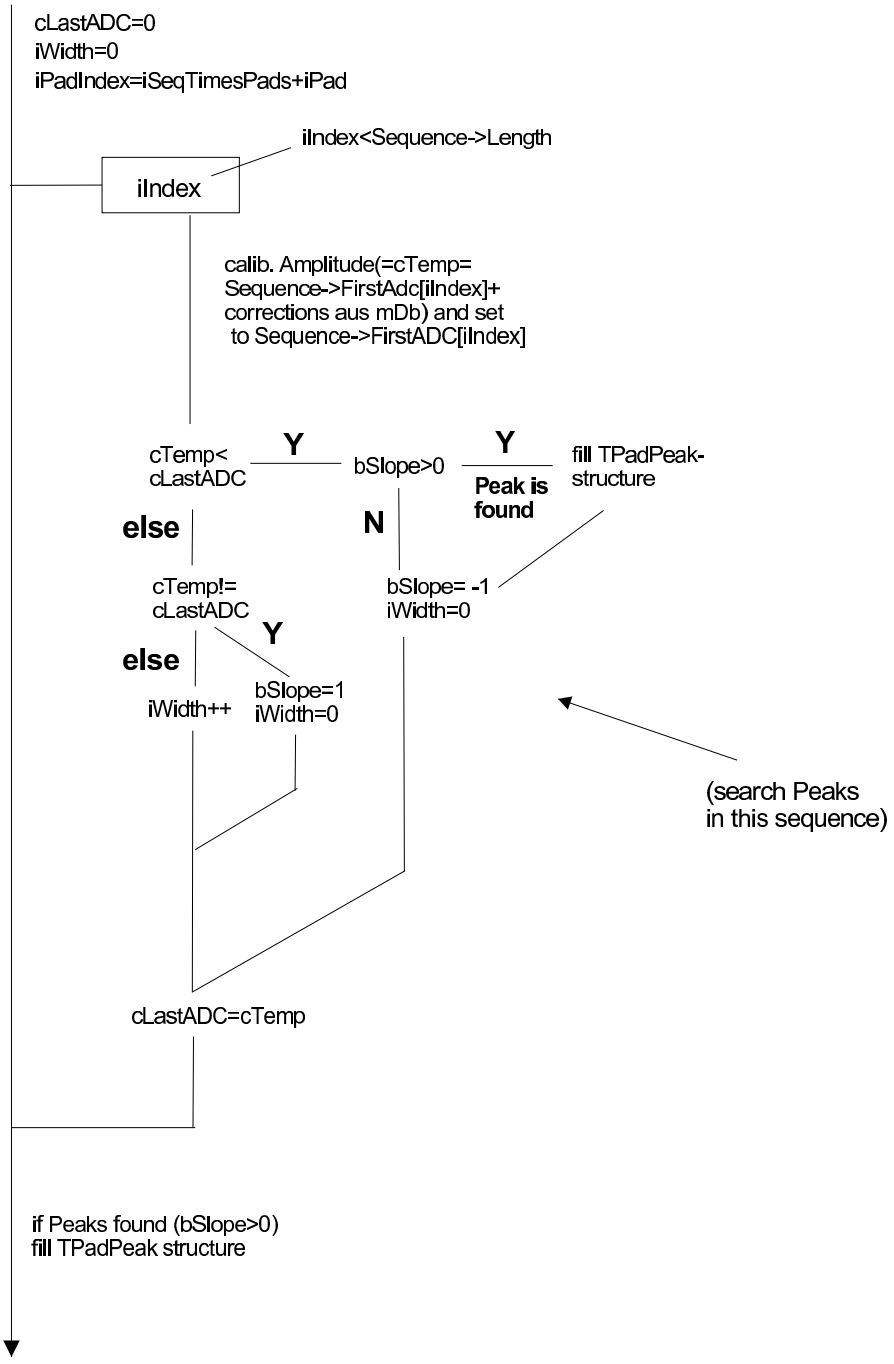
StFtpcClusterFinder::findHits(...)

::findHits(TClusterUC *Cluster, int iRow, int iSec, double *pradius, double *pdefelection, float fastlog[256])



StFtpcClusterFinder::getSeqPeaksAndCalibAmp(...)

::getSeqPeaksAmdCalibAmp(TPCSequence *Sequence, int iRow, int iSeqTimesPads, int iPad, TPadPeak *Peak, int *pNumPeaks)



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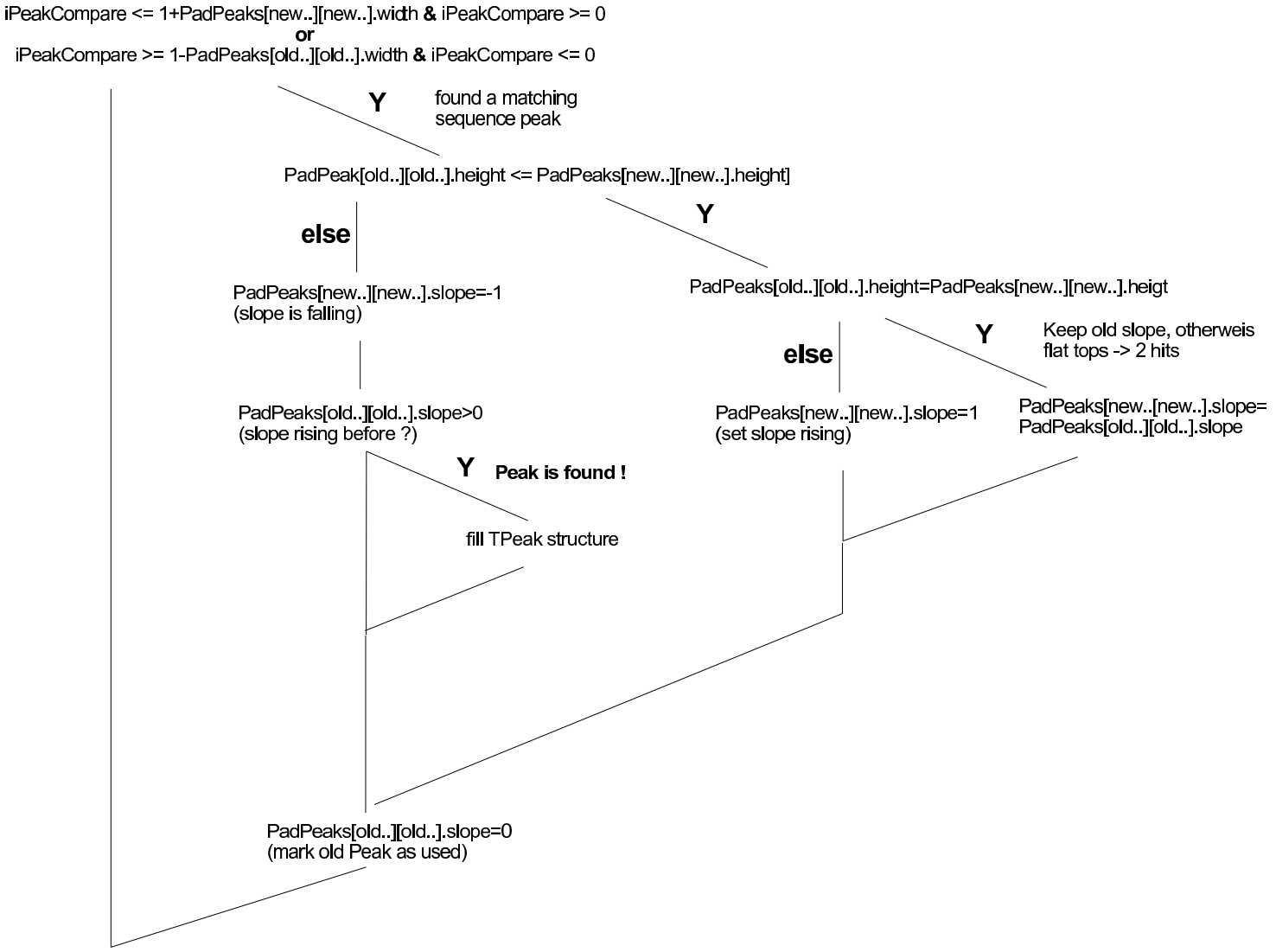

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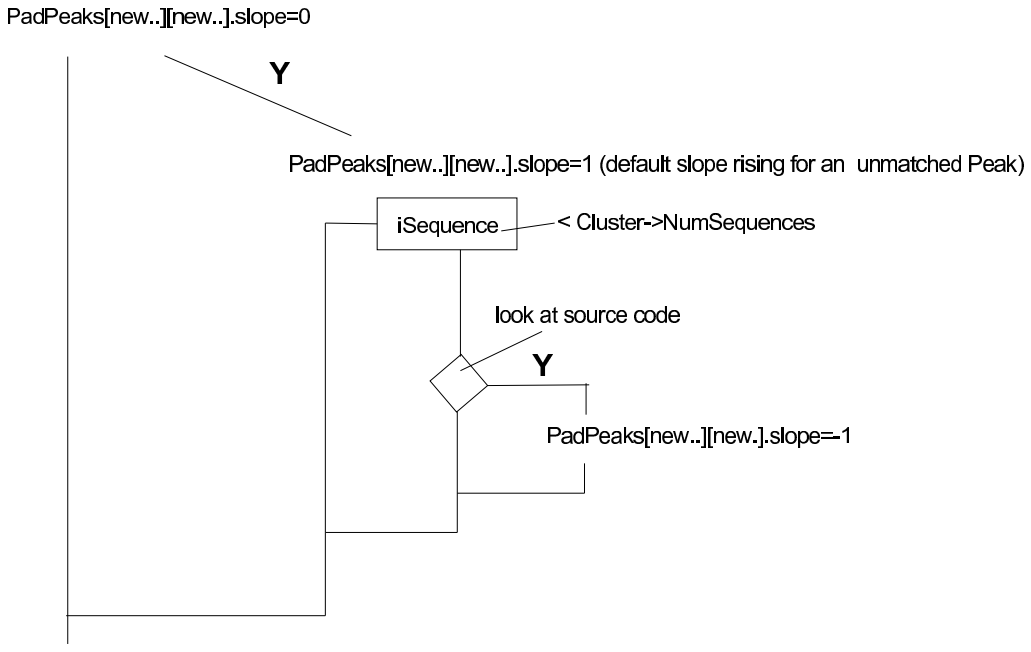
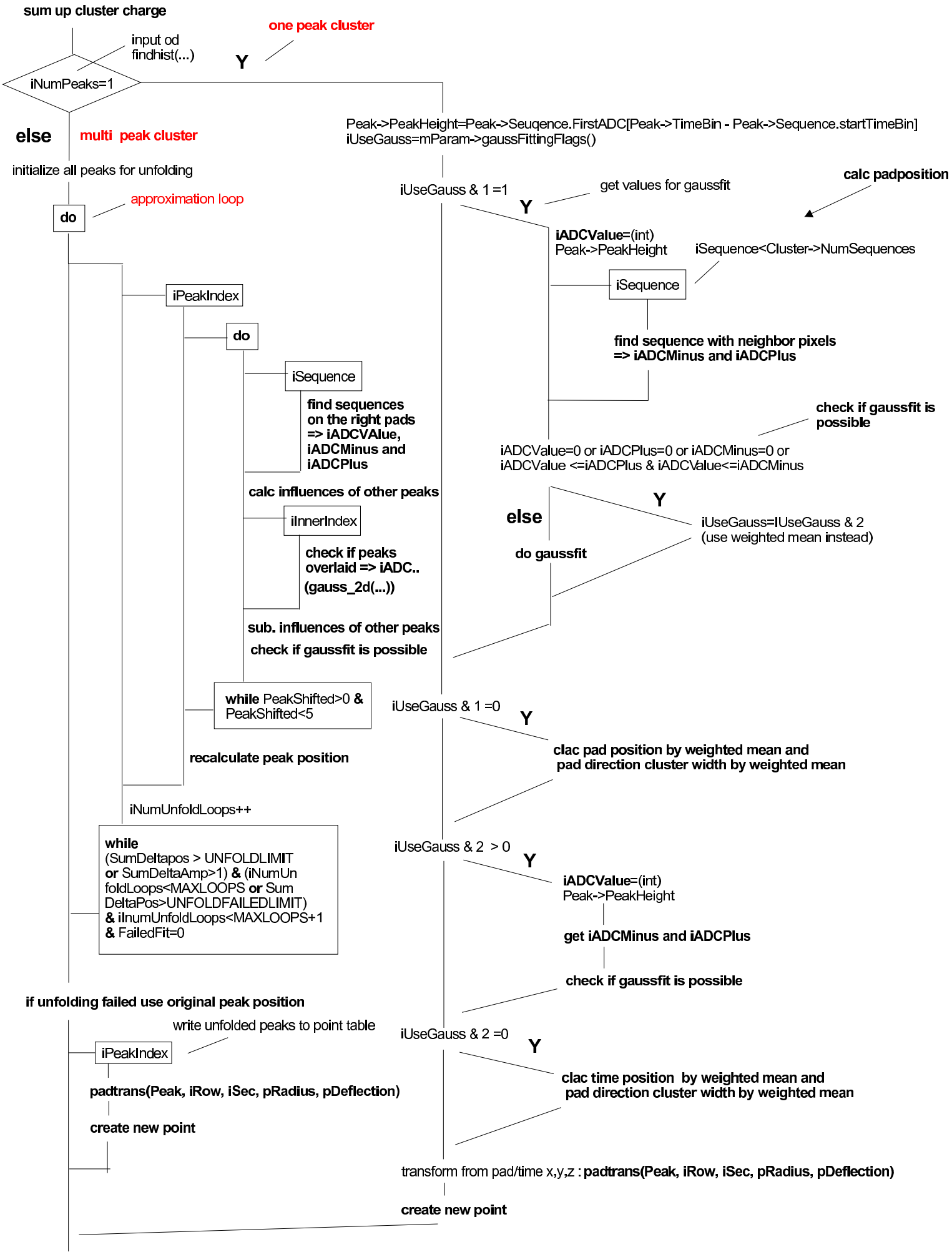


StFtpcClusterFinder::fitPoints(...)

::fitPoints(TClusterUC *Cluster, int iRow, int iSec, double *pradius, double *pdefelection, TPeak *Peak, int iNumPeaks, float fastlog[256])