# section9_Ex.5

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5. What is the difference between flat-fielding and fringe correction?

- Flat-fielding correction （こっちが先）
    - used for correcting pixel variations in QE
    - A flat-field image is obtained by dithering, median-filtered or dome flat.
    - An acquired image are **divided** by the flat-field image.

- Fringe correction （こっちが後）
    - Eliminate the fringe pattern which occurs within a substrate.
    - Adaptive modal filtering produces a fringe frame.
    - The scaled fringe frame must be **subtracted** from flat-fielded object frame.

9.3 FLAT-FIELDING STARATEGIES
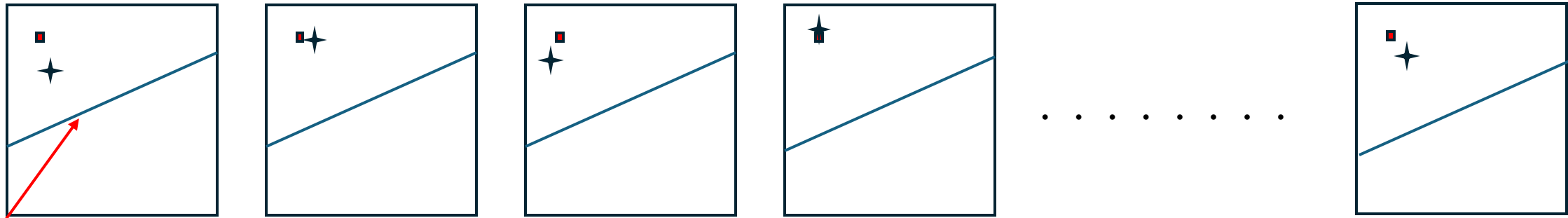

(dithering)。

https://astro-dic.jp/dithering/
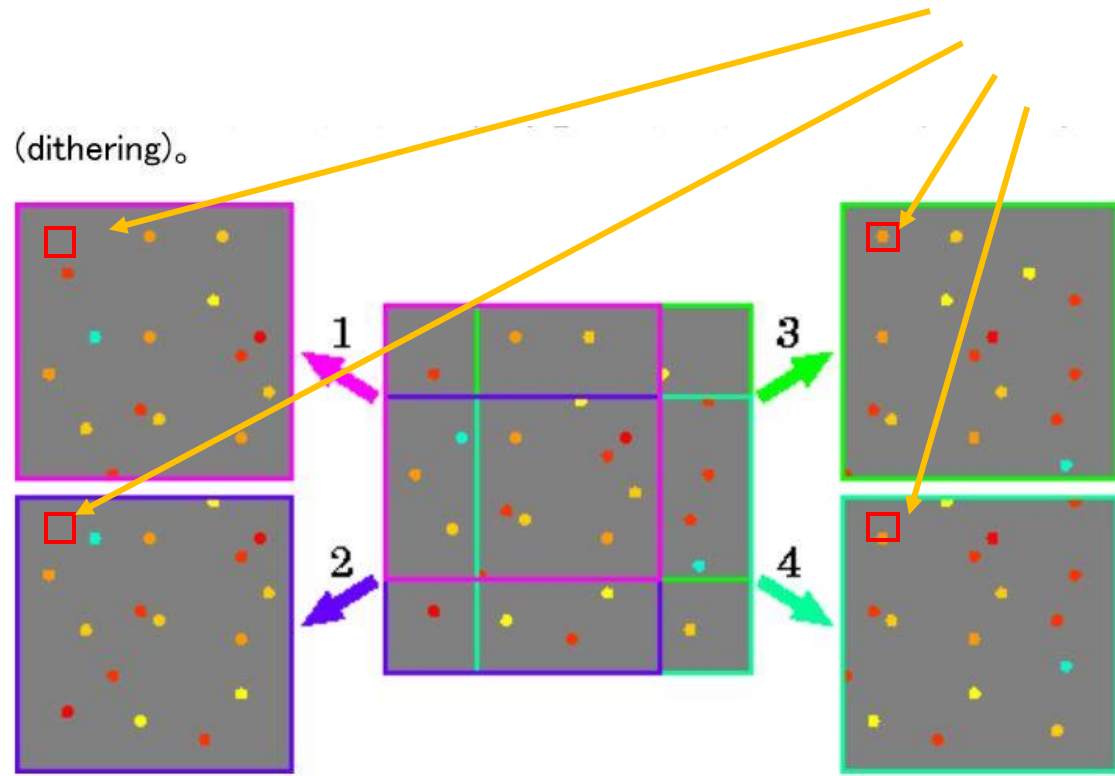
1. The sequence of dithered exposures is examined
2. The frequency histogram examined
3. One signal value (or a small range) will turn out to **the pure night sky background**

(矢印のpixelに天体が載っていたり、載っていなかったりする。画像枚数だけ、pixelカウントを調べるとカウントの中央値がbackgroundに相当)
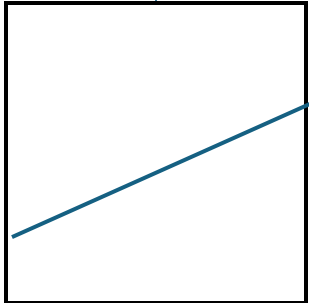
For flat-field correction

Dithered images

Fringe pattern

A dataset of count at a given red pixel= (100,110,93,10000,98,101,102,89,…)

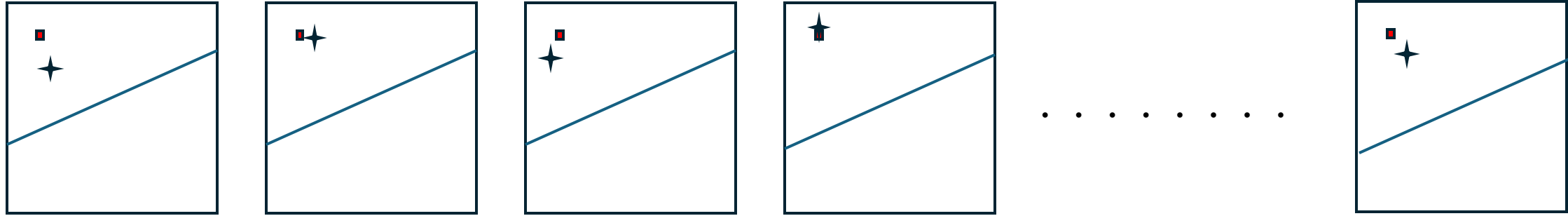A median value is selected in order to remove the count of a object.

Then, adopt this method over all the pixels

A flat-field image (a pure night sky background image) can be acquired.
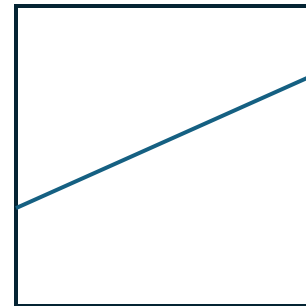
For fringe correction

Adaptive modal filtering

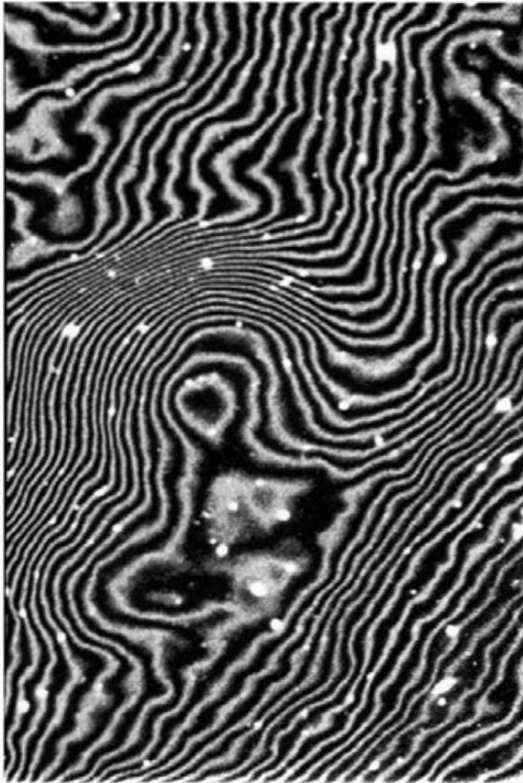A dataset of count at a given red pixel= (100,110,93,98,10000,101,102,89,···)

1. Calculate the absolute difference between median and mean value.
2. Rejects the deviant value -> delete objects
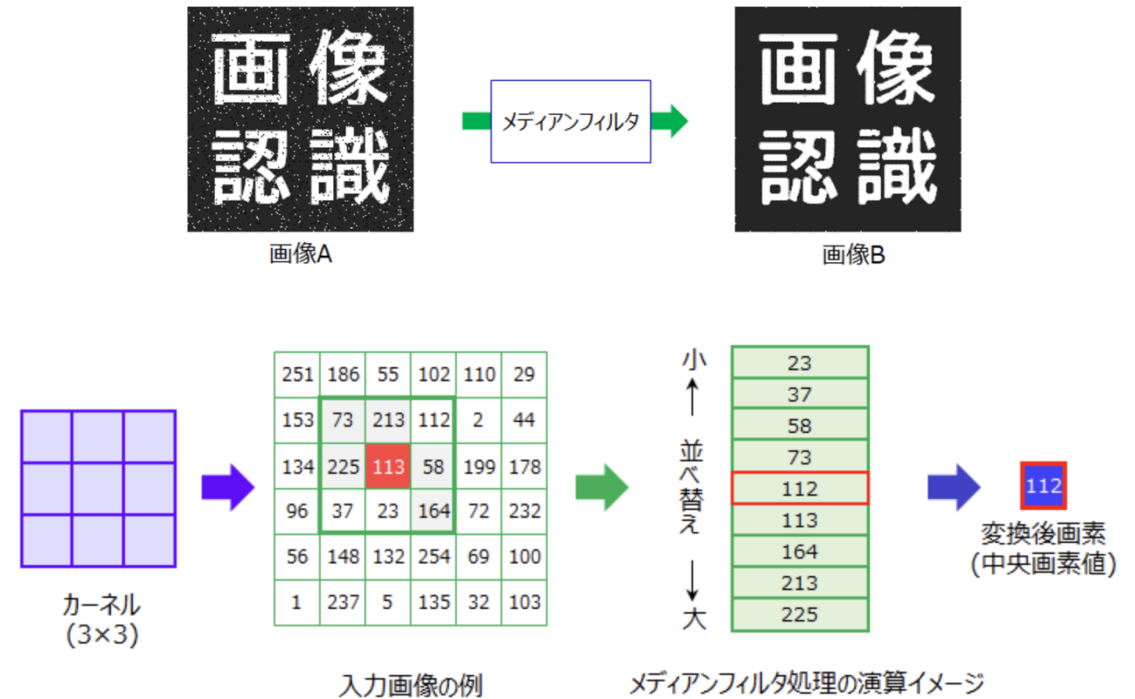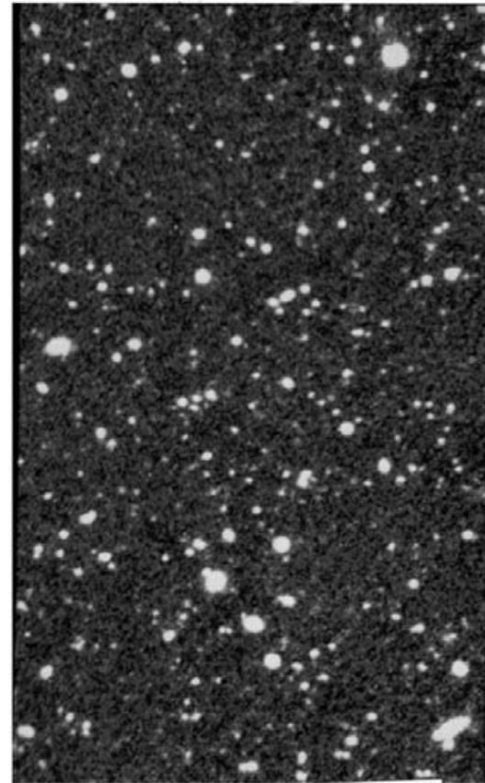3. A given pixel is median-filtered over all the images

The clear fringe pattern without objects is acquired

Median filter

Fringe pattern

Removal of fringing

入力画像の例

メディアンフィルタ処理の演算イメージ

(https://www.frontier.maxell.co.jp/blog/posts/17.html)