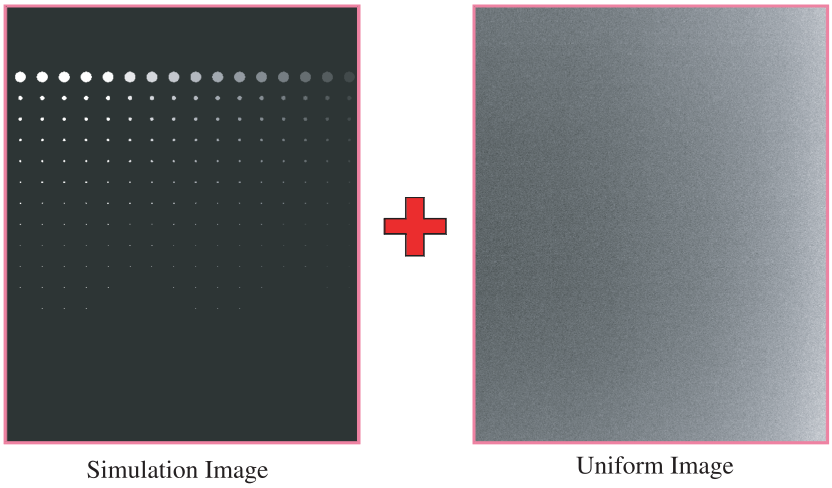

Fig. 1. Simulated image comprising 18 rows and 16 columns. The left signals have higher contrast than the right signals. The signal diameter reduces toward the bottom, and the signals in the lower right region are difficult to detect. The simulated image was merged to an image uniformly exposed by PCM at 24 kV and 25 mAs.

Table 1. Image-reduction rate.

LCDs	Number of Pixels/LCD	Reduction rate (%)	Number of Pixels/Reduced image
2 million	1200 × 1600	16.87	1105 × 1480
3 million	1536 × 2048	21.60	1430 × 1916
5 million	2028 × 2560	27.00	1625 × 2177
5 million (split-screen display)	1023 × 1370	14.46	910 × 1219

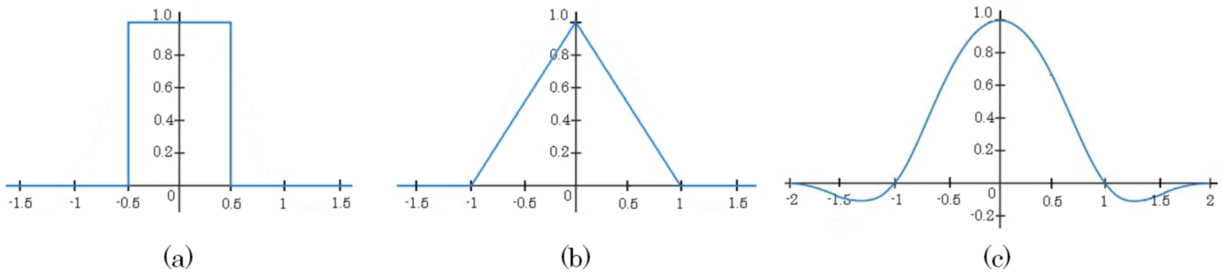

Fig. 2. Interpolation functions (a) nearest neighbor method (b) bilinear method (c) bicubic method.

200 pixels. In the horizontal direction, the pixel value of the signals increased by 5% from 5% to 95% against the background (Ishida *et al.*, 1984). The simulated image was merged to an image uniformly exposed by PCM at 24 kV and 25 mAs. Its matrix size was the same as that of the PCM image.

2.2 Image-reductionrate

The image-reduction rate was calculated as the ratio of the number of pixels per LCD to that per reduced image when the simulated image was displayed on LCDs of 2-, 3-, and 5-million pixels. Moreover, we examined the signal-detection rate at specific image-reduction rates when displaying right and left mammographic images simultaneously on a 5-million-pixel LCD. Table 1 shows the number of pixels per LCD used in this study and the corresponding image-reduction rates.

2.3 Interpolation methods

The simulated image was reduced by using 3 interpolation methods: the nearest neighbor, bilinear, and bicubic methods (Parker *et al.*, 1983; Lehmann *et al.*, 1999). Figure 2 shows the waveform of each function.

2.3.1 Nearest neighbor method From a computational standpoint, the easiest interpolation algorithm to implement is the so-called nearest neighbor algorithm, in which each pixel is given the value of the sample closest to it. Four grid points are needed to evaluate the interpolation function in the 2-dimensional nearest neighbor method. The interpolation kernel for each direction is as follows:

$$ {}^{\text{Nearest-neighbor}}h(x) = \begin{cases} 1, & 0 \le |x| < 0.5 \\ 0, & \text{elsewhere.} \end{cases} \tag{1} $$

Therefore, strong aliasing and blurring effects are associated with the nearest neighbor method for image interpolation.