

# Graphics & Visualization

## Principles and Algorithms

### Errata

*Last update: 20 January 2010*

Each erratum is marked with a number corresponding to the date it was reported, as follows:

- 1 – 25 Jan 2009
- 2 – 16 Feb 2009
- 3 – 13 May 2009
- 4 – 11 Sep 2009
- 5 – 20 Jan 2010

**Errors** are given in red, **corrections** in green.

- 1 **page xi**. Remove the last 2 lines of the page (they are repeated on the next page).
- 1 **page xiii**. In the bullet point referring to Chapter 17, change **page 622** to **page 620**.
- 5 **page 17**. In the paragraph on double buffering, second line, reverse **random/sequential** to **sequential/random** (so that they correspond to reading and writing of the frame buffer memory).
- 4 **page 17**. In the paragraph on double buffering, change the end of the first sentence from **generated**. to **generated, thus displaying an incomplete frame (this is called tearing)**. (Suggestion by Sugih Jamin)
- 4 **page 18**. Change to second sentence of the page from **In this case ... differences.** to **Tearing is still possible if the sequential reading of the front buffer has not completed a whole frame and the contents of the two buffers have significant differences.** (Suggestion by Sugih Jamin)
- 5 **page 34**. In algorithm **line3**, the third line, **e=-(dx >> 1);**, must be moved after the lines assigning **dx** and **dy**.
- 1 **page 42**. In the first paragraph, line 8, change **rasterized** to **not rasterized**; conversely in line 9, change **not rasterized** to **rasterized**. Also correct the spelling of **verticies** (in lines 8–9) to **vertices**.
- 5 **page 43**. Lines 6–7: change **the minimum  $x$**  to **the  $x$ -coordinate of the intersection of the scanline with the edge**. Also in Figure 2.15, change the label  **$x_{\min}$**  to  **$x$** .
- 5 **page 121**. In Section 4.2.1, second paragraph, lines 4–5, correct **the projections  $P_1$  and  $P'_1$  of  $P$  and  $P'$**  to **the projections  $P'_1$  and  $P'_2$  of  $P_1$  and  $P_2$** .
- 5 **page 133**. In the last paragraph, first line, change  **$P_{PER}$**  to  **$P_{PER}$** . (Reported by Sugih Jamin)
- 1 **page 153**. In the caption of Figure 5.5, replace **stab** by **stub**.
- 1 **page 154**. Three lines before the end of the text, replace **stab** by **stub**.
- 4 **page 189**. Second paragraph, lines 2–3: rephrase **it is easily reversible to the coarse base model by performing vertex splits (Figure 6.9)** to **it is easily reversible by performing vertex splits (Figure 6.9) to the coarse base model**.
- 2 **page 212**. At the end of equation (7.32b) replace the index  **$i$**  by  **$j$**  so that the last line reads  **$j = i - k + r, \dots$**
- 5 **page 243**. Three lines after equation (7.66) change **curve** to **surface**.
- 5 **page 245**. Second paragraph, line 7: change **curve** to **surface**.
- 5 **page 247**. In exercise 4, at the start of the second line add the word **multiple** so that the sentence becomes **...to insert the same knot  $s$  multiple times...**

- 3 **page 264.** In item (b) and in equation (8.12) change  $\mathbf{v}_{i+1}^j$  to  $\mathbf{v}_i^{j+1}$ . Also in equation (8.12) change, for clarity, the summation index from  $j$  to  $k$  so that it becomes  $\sum_{k=1}^n \mathbf{c}_k$ .
- 3 **page 265.** In equation (8.14) change  $\alpha$  to  $\alpha_n$  (four times).
- 3 **page 265.** In step 1 of the modified butterfly scheme, change  $\mathbf{v}_{i+1}^j$  to  $\mathbf{v}_i^{j+1}$ .
- 3 **page 266.** In equation (8.15) change  $\mathbf{v}e_{i+1}^j$  to  $\mathbf{v}e_i^{j+1}$ . Also change the index  $i$  to  $k$  inside the summation so that it becomes  $\sum_{k=1}^8 \alpha_k \mathbf{c}_k$ .
- 3 **page 266.** In equation (8.16) change the index  $i$  with  $k$  everywhere.
- 3 **page 266.** In the last line change the index  $i$  with  $k$  for the vertices  $\mathbf{c}_i$  of the ring, which become  $(\mathbf{c}_k)_{(0 \leq k \leq n-1)}$ .
- 3 **page 267.** Right below equation (8.17), change **valency** to **valence** (for consistency of terminology).
- 3 **page 267.** In equation (8.17) change  $\mathbf{v}e_{i+1}^j$  to  $\mathbf{v}e_i^{j+1}$ . Also change the index  $i$  to  $k$  inside the summation so that it becomes  $\sum_{k=0}^{n-1} \alpha_k \mathbf{c}_k$ .
- 3 **page 267.** Right below equation (8.17) change  $i$  to  $k$  so that  $\alpha_i$  becomes  $\alpha_k$ . Also correct the first formula to  $\alpha_k = \frac{1}{n} \left( \frac{1}{4} + \cos \frac{2\pi k}{n} + \frac{1}{2} \cos \frac{4\pi k}{n} \right)$ .
- 4 **page 268.** In equation (8.19) and above change the index  $i$  to  $r$  for consistency, so that  $\alpha_i$  becomes  $\alpha_r$  and (8.19) becomes  $\alpha_r = 2 \sum_{j=0}^{\bar{n}} 2^{-j} \cos \frac{2\pi r j}{n}$ .
- 4 **page 269.** In steps 2(a) and 2(b) of the  $\sqrt{3}$  scheme, change index  $i$  in the notation of the ring vertices to  $k$ , so that  $\mathbf{b}_i$  becomes  $\mathbf{b}_k$  in step (a) and in equation (8.20) (where the summation index should also be changed from  $i$  to  $k$ ).
- 1 **page 269.** In Item 1 near the bottom of the page change “It is an interpolating scheme.” to “It is not an interpolating scheme.”
- 4 **page 270.** In the second paragraph of Section 8.5, two lines before the end, change **whereas the butterfly and  $\sqrt{3}$  schemes are interpolating** to **whereas the butterfly scheme is an interpolating one**.
- 5 **page 372.** In Figure 12.5, the angles  $\phi_r$  and  $\phi_i$  should be marked as  $\varphi_r$  and  $\varphi_i$  for consistency with the text. (Reported by Sugih Jamin)
- 5 **page 379.** In Figure 12.11, the angle  $\phi$  should be marked as  $\varphi$  for consistency with the text. (Reported by Sugih Jamin)
- 5 **page 390.** Starting from the end of line 4 of 12.6, change the sentence **In 1971 Gouraud . . . at the vertices [Gour71] to Warnock, Romney and Watkins suggested the interpolation of intensity values within polygons from intensity values computed at the vertices. In 1971 Gouraud [Gour71] integrated their works and suggested the computation of unique vertex normals on shared polygon vertices..**
- 1 **page 467.** Last line before the final paragraph: correct spelling of **repspectively** to **respectively**.
- 1 **page 469.** In equation (14.6) change  $p_2$  to  $\mathbf{p}_2$  on the first line and  $p_3$  to  $\mathbf{p}_3$  on the second line (that is, change italics to bold so that they are marked as points).
- 4 **page 668.** Change the last part of the first line and the start of the second line from **; they are also to and**.
- 1 **page 676.** In the middle of the page, change  $\lambda[a_x, a_y, a_z]$  to  $\lambda[a_x, a_y, a_z]^T$  (add the transpose mark).
- 1 **page 678.** In the fifth line of text, change vector  $[5, 1, 2]$  to  $[5, 1, 2]^T$  (add the transpose mark).