Epilogue

In this book, a model has been given for the contrast sensitivity of the eye and its effects on perceived image quality. The model is based on the assumption that the contrast sensitivity is determined by internal noise in the visual system. In the different chapters, the model was extended to various aspects of the visual system. In all cases, the model predictions were compared with published measurement data. These measurements generally confirmed the validity of the assumptions that were made. At the end, the author would still like to make a few remarks that may be useful for further investigations.

Remarkable are some properties of the visual system that were met during the development of the model:

1. The constancy of the signal-to-noise ratio k and the reason of its rather high value of 3 (See section 2.2).
2. The low value of 3% for the quantum efficiency η (See section 3.4).
3. The limitation of the integration area of the eye by a maximum number of 15 cycles (See sections 2.4 and 4.4.2).

These properties should be investigated more deeply to get a better insight into the behavior of the visual system.

For practical reasons, the model was restricted to photopic vision (daylight vision) and also the vision of color was left out of consideration. Although the contrast sensitivity of the eye is mainly of importance at photopic viewing conditions and the perceived image quality is mainly determined by the achromatic properties of vision, an extension of the model to scotopic vision (night vision) and an investigation of the effects of color would be useful for further applications.

The constants used in the model are largely based on contrast sensitivity measurements with young adult observers between 18 and 28 years of age. The so obtained values are considered as typical values. It would be interesting to investigate how these constants change with age. Furthermore, it would be interesting to investigate the effect of visual defects, like cataract, glaucoma, macular degenera-

tion, etc. on these constants. This could give a deeper insight into the visual system and the character of these defects.

For future measurements of the contrast sensitivity function, one should consider the following measures:

1. Using the psychometric function for determining the modulation threshold. This gives the most accurate measurement results.
2. Applying also external noise. This gives extra information of the constants that play a role in contrast sensitivity.
3. Using a constant field size and a constant viewing distance. By using a constant field size, other factors that influence the results, like pupil size and the used area of the retina, are constant.

For the given models a large number of assumptions had to be made about the biological structure of the retina and the visual processing in retinal elements and nerve fibers. It would be interesting to check these assumptions by direct biological and anatomical measurements. This would give a deeper insight into the visual system and could possibly support the validity of the models.

Subject index

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