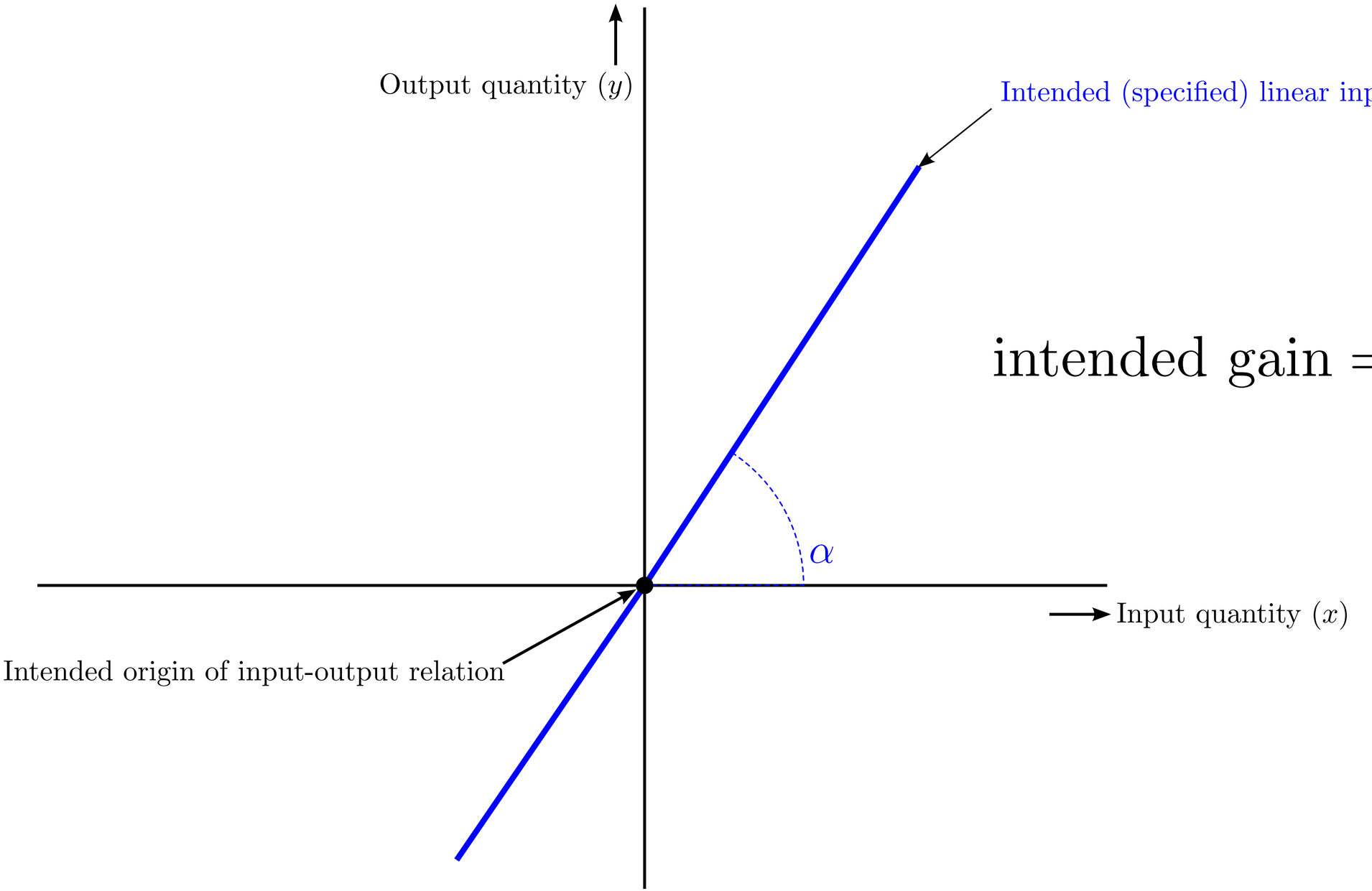
Structured Electronic Design

EE3C11
Amplifiers: weak nonlinearity

Anton J.M. Montagne

Static (DC) input-output relation



$$\text{intended gain} = \tan\alpha$$

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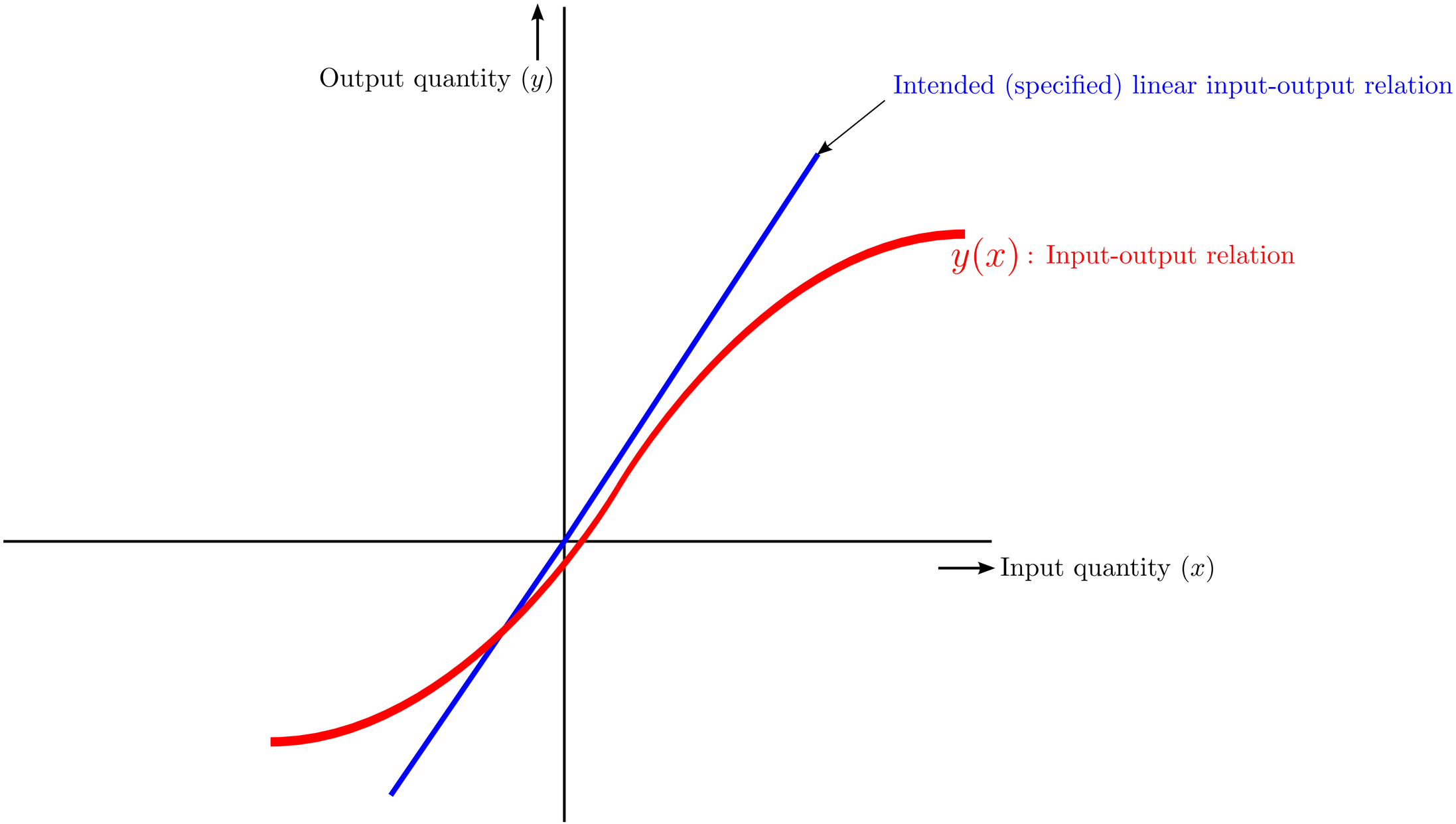
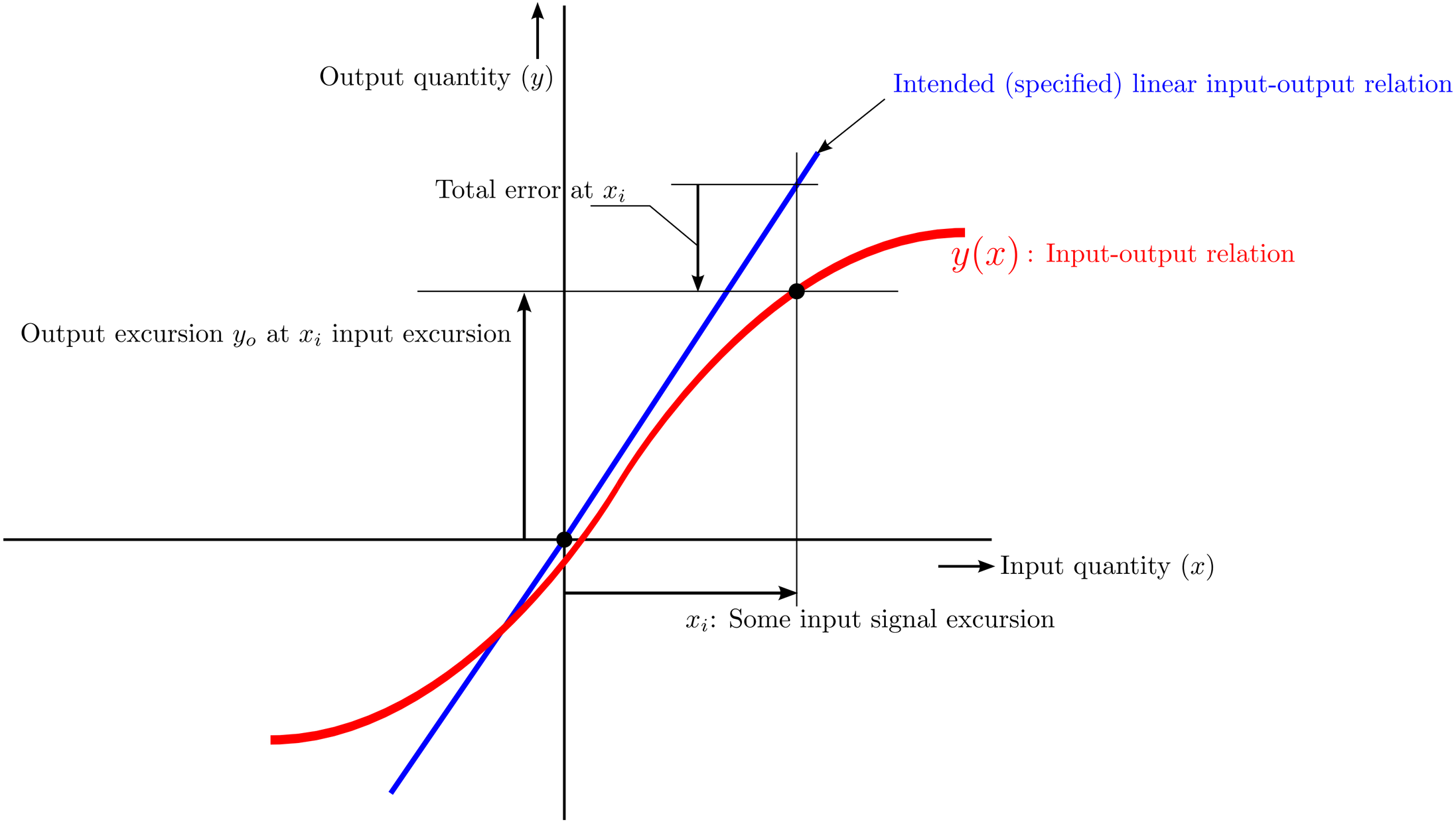
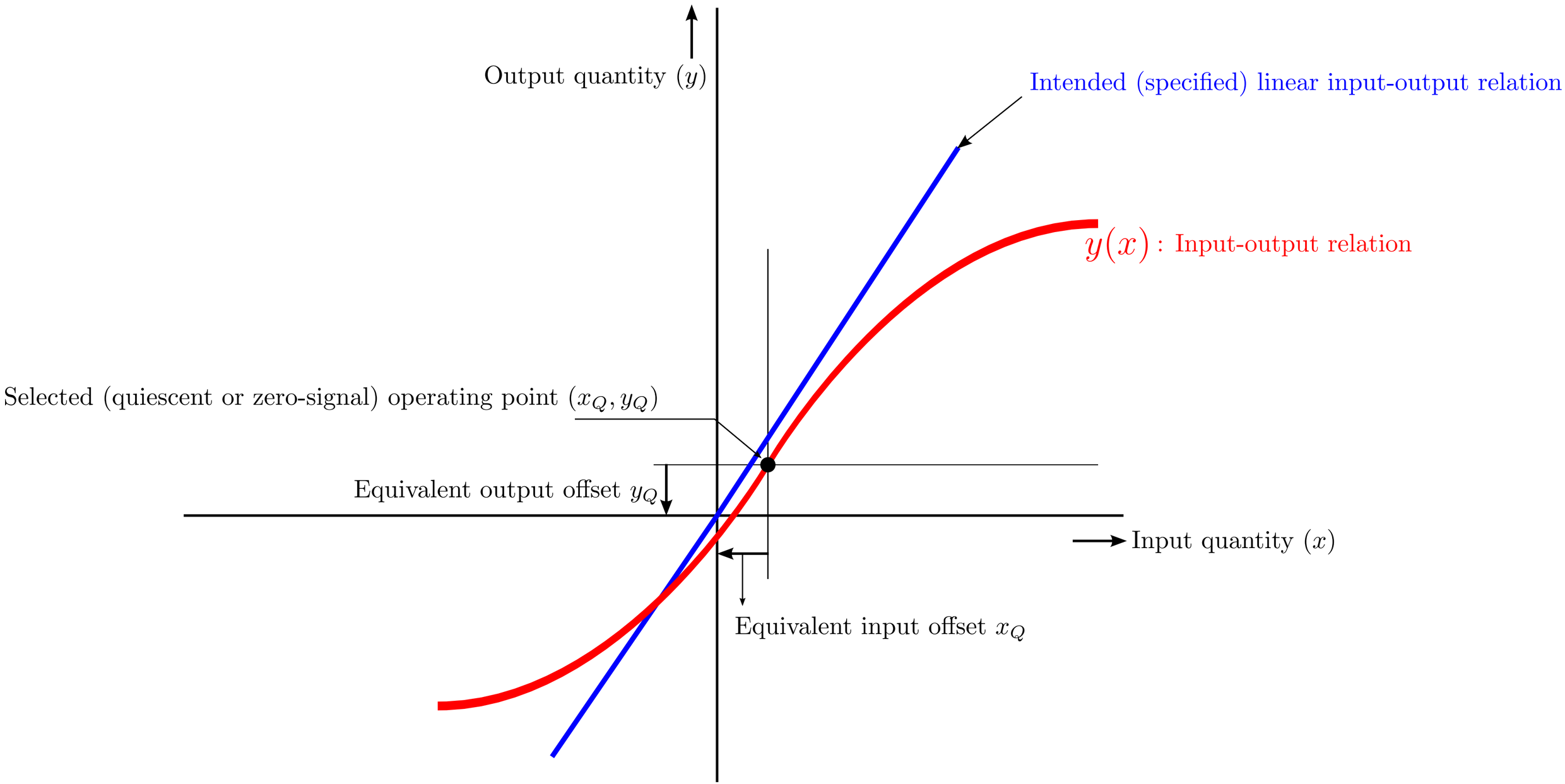


Total error



Operating point and offset



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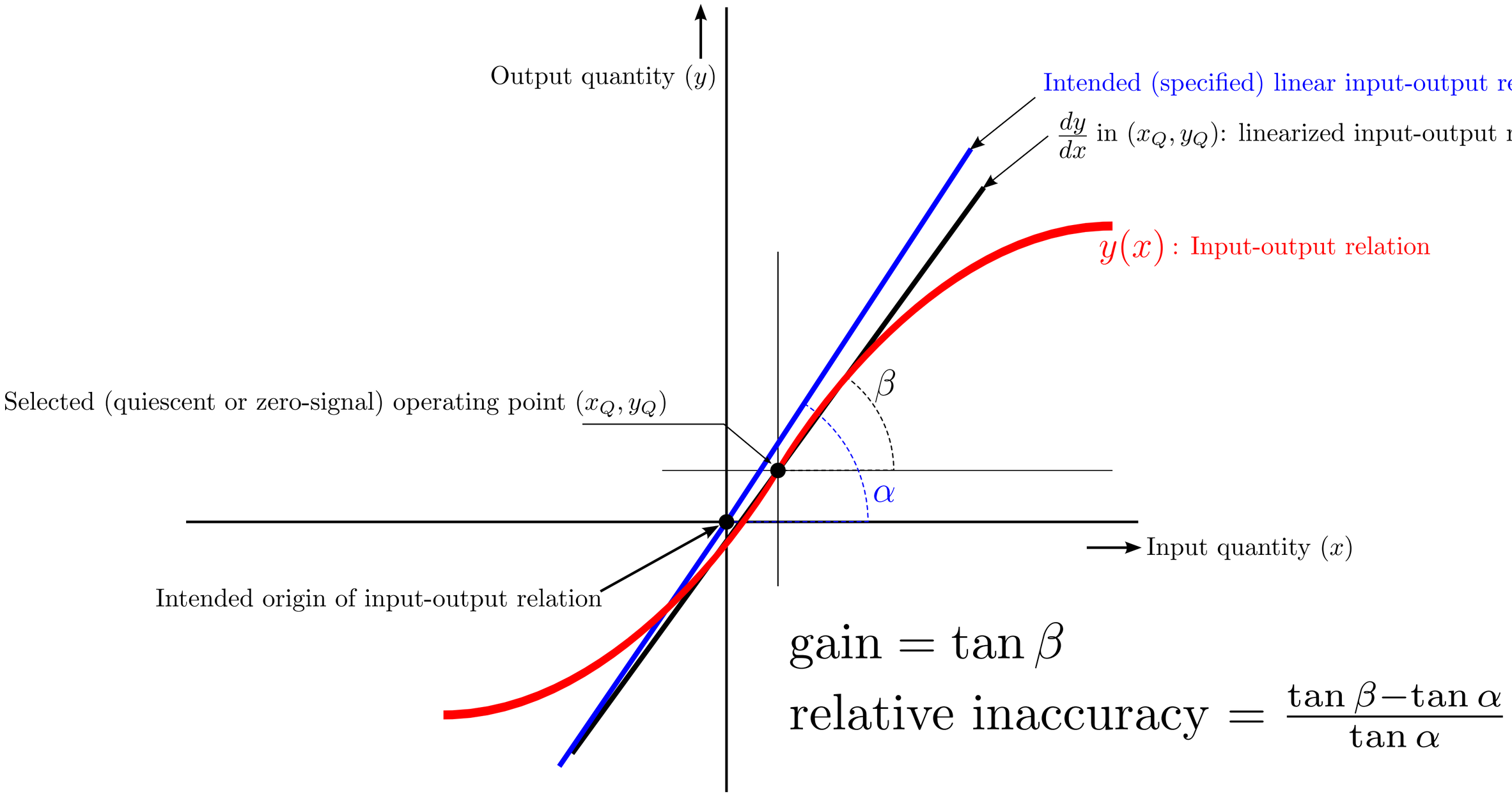
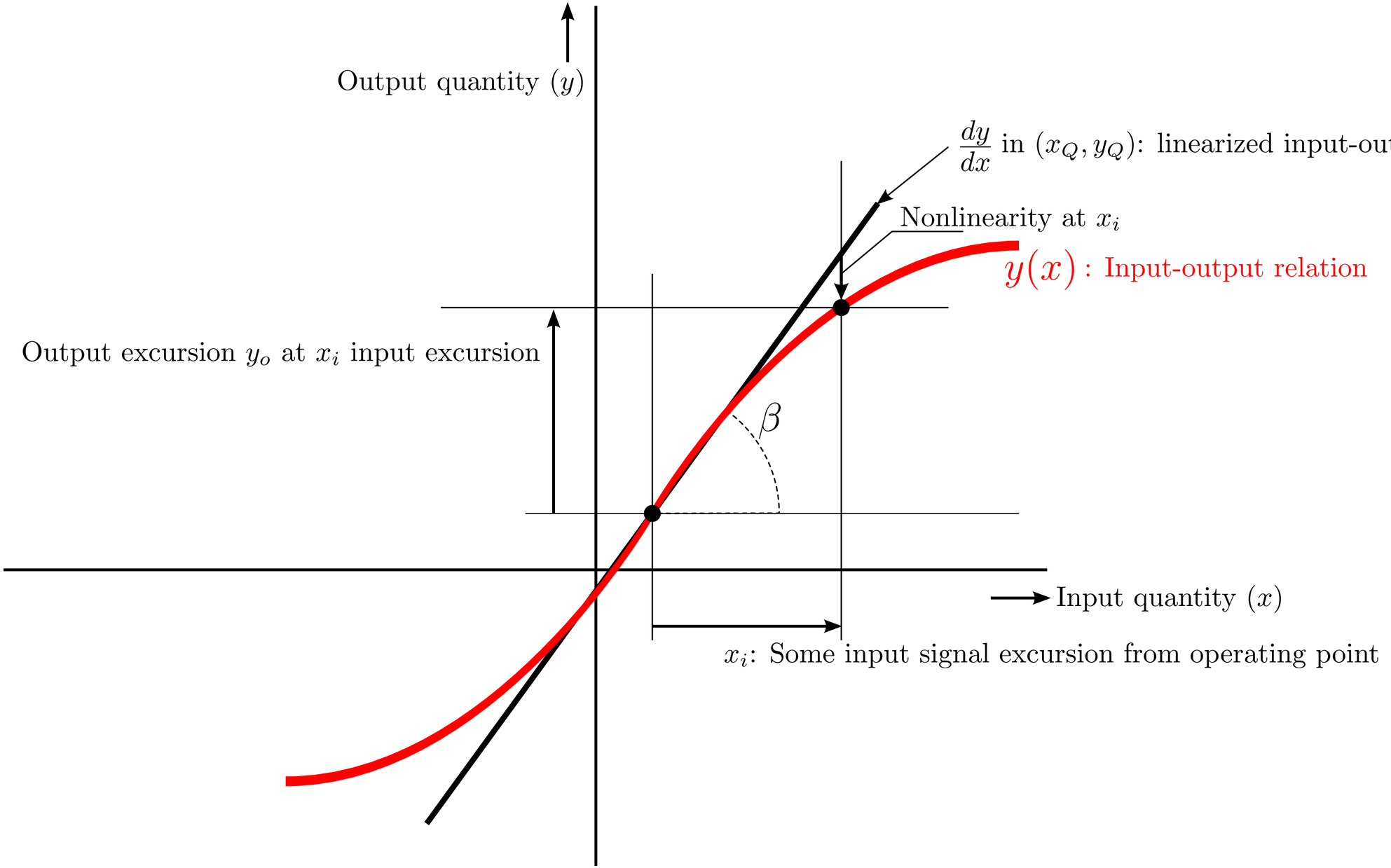


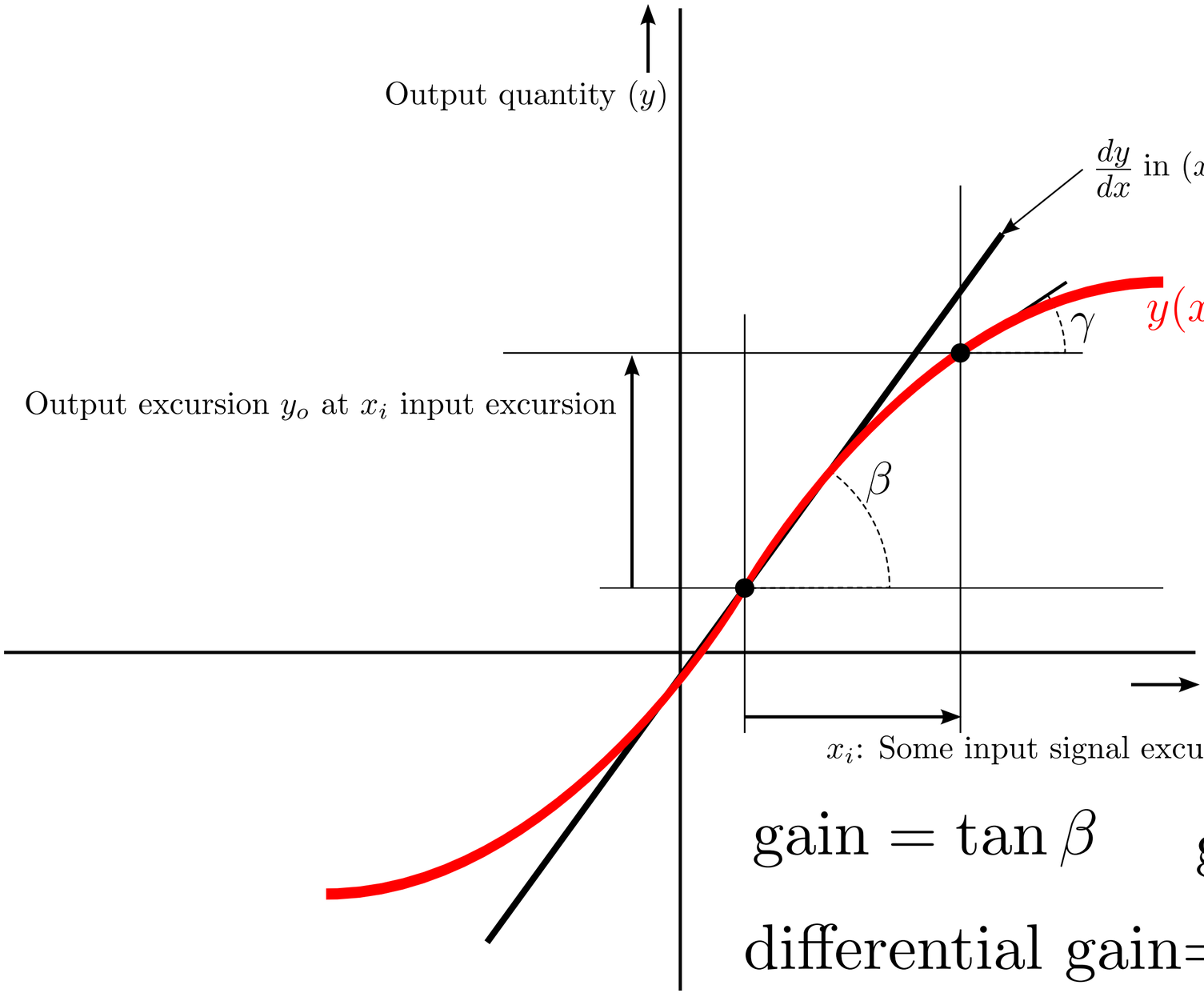
$$\text{gain} = \tan\beta$$

$$\text{relative inaccuracy} = \frac{\tan\beta - \tan\alpha}{\tan\alpha}$$

Nonlinearity



Differential gain



$$\text{gain} = \tan\beta \qquad \text{gain}\big|_{x=x_i} = \tan\gamma$$

$$\text{differential gain} = \frac{\tan\gamma - \tan\beta}{\tan\beta}$$

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Intermodulation distortion

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See sections: 2.4.7, 2.4.8, 17.5 and 17.6

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