

(1)  $I_1 + I_2 = I_0 = \text{const.}$   
 (1a)  $I_2 = I_0 - I_1$   
 (2)  $0 \leq |I_1 - I_2| \leq I_x$   
 (3)  $I_1 = I_x \cdot \exp(+V_x)$   
 (4)  $I_2 = I_x \cdot \exp(-V_x)$  E. Vittoz et C. Enz (5.42)  
 (5)  $I_1 - I_2 = I_x \cdot (\exp(+V_x) - \exp(-V_x)) = 2I_x \cdot \sinh(V_x)$   
 (6)  $I_1 + I_2 = I_x \cdot (\exp(+V_x) + \exp(-V_x)) = 2I_x \cdot \cosh(V_x) = I_0 = \text{const.}$   
 (10)  $(I_1 - I_2) / (I_1 + I_2) = \tanh(V_x) = (I_1 - I_2) / I_0$   
 (10a)  $(I_1 - I_2) = I_0 \cdot \tanh(V_x)$   
 (11)  $I_1 = I_2 + I_0 \cdot \tanh(V_x)$   
 (12)  $I_2 = I_1 - I_0 \cdot \tanh(V_x)$   
 (1a)=(12)  $I_2 = I_0 - I_1 = I_1 - I_0 \cdot \tanh(V_x)$   
 $2 \cdot I_1 = I_0 + I_0 \cdot \tanh(V_x)$   
 (13)  $I_1 = (I_0/2) \cdot (1 + \tanh(V_x))$   
 (13)->(12)  $I_2 = I_1 - I_0 \cdot \tanh(V_x) = (I_0/2) \cdot (1 + \tanh(V_x)) - I_0 \cdot \tanh(V_x)$   
 $I_2 = (I_0/2) \cdot (1 - \tanh(V_x))$

Comparison with E. Vittoz' equation (8.14):

(14)  $I_0 / (1 + \exp(-V_{id}/nU_t)) = I_1 = (I_0/2) \cdot (1 + \tanh(V_x))$   
 (15)  $I_0 / (1 + \exp(+V_{id}/nU_t)) = I_2 = (I_0/2) \cdot (1 - \tanh(V_x))$   
 (14a)  $1 / (1 + \exp(-V_{id}/nU_t)) = I_1/I_0 = (1/2) \cdot (1 + \tanh(V_x))$   
 (15a)  $1 / (1 + \exp(+V_{id}/nU_t)) = I_2/I_0 = (1/2) \cdot (1 - \tanh(V_x))$

This is correct for  $V_x = (V_{id}/nU_t)/2$

The proof for

(14b)  $1 / (1 + \exp(-x)) \equiv (1 + \tanh(x/2)) / 2$   
 (14b)  $1 / (1 + \exp(+x)) \equiv (1 - \tanh(x/2)) / 2$

... is left to you ;-)