1 Collection of Perimetric Formulas

1.1 MS – Mean Sensitivity

$$MS = \frac{1}{m} \sum_{i=1}^{m} \overline{x}_i \tag{1}$$

Symbol	Meaning
$\overline{x}_i$	averaged local value for test location i[1]
m	number of tested locations (outside the blind spot)

Reference [2] (consistent with [4])

1.2 MD (Octopus) – Mean Defect

$$MD_{Octopus} = \frac{1}{m} \sum_{i=1}^{m} (z_i - \overline{x}_i) \tag{2}$$

Symbol	Meaning
z_i	age corrected normal value of test location i
$\overline{x}_i$	value of test location i (estimated as $\overline{x}$) if repeated measurements are available
m	number of tested locations (outside the blind spot)

Reference [3]

1.3 MD (HFA) - Mean Deviation

$$MD_{HFA} = \left[\frac{1}{m} \sum_{i=1}^{m} \frac{(x_i - z_i)}{S_{1i}^2} \right] : \left[\frac{1}{m} \sum_{i=1}^{m} \frac{1}{S_{1i}^2} \right] \tag{3}$$

Symbol	Meaning
S_{1i}^2	variance of the normal field measurement at location i
z_i	normal reference threshold at location i
x_i	measured threshold of test location i
m	number of tested locations (excluding the blind spot)

Reference [1]

[1] $\overline{x}_i = \frac{1}{n} \sum_{k=1}^{n} x_{ik}$, where x_{ik} is the k-th repetition at location i

1.4 LV (Octopus) - Loss Variance

$$LV = \frac{1}{m-1}\sum_{i=1}^{m}(z_i - \overline{x}_i - MD_{Octopus})^2 \tag{4}$$

Symbol	Meaning
$MD_{Octopus}$	Mean Defect as defined above
z_i	age corrected normal value of test location i
$\overline{x}_i$	value of test location i (estimated as $\overline{x}$) if repeated measurements are available
m	number of tested locations

Reference [4] (consistent with [3])

1.5 PSD (HFA) - Pattern Standard Deviation

$$PSD = \sqrt{\left[\frac{1}{m}\sum_{i=1}^{m} S_{1i}^2\right] * \left[\frac{1}{m-1}\sum_{i=1}^{m}\frac{(x_i - z_i - MD_{HFA})^2}{S_{1i}^2}\right]} \tag{5}$$

Symbol	Meaning
MD_{HFA}	Mean Deviation as defined above
S_{1i}^2	variance of the normal field measurement at location i
z_i	normal reference threshold at location i
x_i	measured threshold of test location i
m	number of tested locations (excluding the blind spot)

Reference [1]

1.6 SF (Octopus) - Short-term Fluctuation

$$SF_{Octopus} = \sqrt{\frac{1}{m}\sum_{i=1}^{m}\left(\frac{1}{n-1}\sum_{j=1}^{n}(x_{ij} - \overline{x}_i)^2\right)} = \sqrt{\frac{1}{m}\sum_{i=1}^{m} s_i^2} \tag{6}$$

Symbol	Meaning
x_{ij}	measured DLS value at location i in repetition j
$\overline{x}_i$	value of test location i (estimated as $\overline{x}$) if repeated measurements are available
n	number of repetitions
m	number of tested locations with short-term repetition

Reference [3](and [4])

1.7 SF (HFA) - Short-term Fluctuation

$$SF_{HFA} = \sqrt{\left[\frac{1}{10}\sum_{i=1}^{10} S_{2i}^2\right] * \left[\frac{1}{10}\sum_{i=1}^{10} \frac{(x_{i1} - x_{i2})^2}{2S_{2i}^2}\right]} \tag{7}$$

Symbol	Meaning
S_{2i}^2	normal intratest variance at location i
x_{i1}	measured threshold of test location i
x_{i2}	repeated measured threshold of test location i
10	fixed number of repeated test locations

Reference [1]

1.8 LF - Long-term Fluctuation

$$LF = \sqrt{\frac{1}{m}\sum_{i=1}^{m} s_i^2} \tag{8}$$

Symbol	Meaning
s_i^2	long-term variance for the measured location i
m	number of tested locations with long-term repetition

Reference [4]

1.9 CLV (Octopus) - Corrected Loss Variance

$$CLV = LV - \frac{1}{n} SF_{Octopus}^2 \tag{9}$$

Symbol	Meaning
LV	Loss Variance as defined above
$SF_Octopus$	Short-term Fluctuation as defined above for Octopus
n	number of repetitions

Reference [4] (consistent with [3])

1.10 CPSD (HFA) - Corrected Pattern Standard Deviation

$$CPSD = \begin{cases} 0 & PSD^2 \leq k * SF_{HFA}^2 \\ \sqrt{PSD^2 - k * SF_{HFA}^2} & PSD^2 > k * SF_{HFA}^2 \end{cases} \tag{10}$$

Symbol	Meaning
PSD	Pattern Standard Deviation as defined above
SF_{HFA}	Short-term Fluctuation as defined above for the HFA
k	$= 1.28$ for the 30-degree field $= 1.14$ for the 24-degree field

Reference [1]

References

[1] D.R.Anderson, V.M. Patella. **Automated Static Perimetry**, 2nd Edition, Mosby St. Louis, 1999

[2] J.Flammer. **The Concept of Visual Field Indices**, Graefe's Arch Clin Exp Ophthalmol , 224: 389 - 392, DOI: 10.1007/BF02173350, Springer Verlag Heidelberg, 1986

[3] J.Flammer, S.M. Drance, L. Augustiny, A. Funkhouser. **Quantification of Glaucomatous Visual Field Defects with Automated Perimetry**, Invest Ophthalmol Vis Sci. 1985, 26: 176-181

[4] U.Schiefer, J. Paetzold, B. Wabbels, F. Dannheim. **Konventionelle Perimetrie, Teil 4: Statische Perimetrie: Befundauswertung – Indizes – Verlaufskontrolle - Perimetrie im Kindesalter**, Der Ophthalmologe 103: S. 235 - 256, DOI: 10.1007/s00347-005-1304-5, Springer Medizin Verlag Heidelberg, 2006