Placeholder Title

Andreas G.

24th of July 2025

Contents

1 Abstract

This paper is exploring the Goldsmith functions. These functions describe a fully adjustable system for quality scoring, notation and handling. One of the main advantages is standardisation. Since the functions are customizeable in terms of range, sensitivity and scaling they can operate from single digit ppq (*parts per quintillion*) up to 12N (99.9999999999%) inputs and even otside of that range they are a standardized notation for almost all branches of industy.

2 Introduction

text (introduction)

3 Proceedings

3.1 Inputs

The formulas have several inputs. While some are used as placeholders in definitions, others have actual meaning in the context of the application of the functions.

3.1.1 Definition of Input Variables

Universal input variables of the function set:

r is a variable which controlls the sensitivety of the $\Lambda_0, \Lambda_n, \Phi_e, \Phi_0$ and Φ_n functions. $r \in \mathbb{Z}$
n is a variable which controlls the scaling strengh of the Rd_n, Ex_n, Φ_n and Λ_n functions. $n \in \mathbb{N}_0$
s is the score calculated from c using Φ_0 or Φ_n. $s \in [100 \cdot (1 - 10^n); 100]$

3.2 Formulas

$$\Xi(v; w; x; y; z) = \begin{cases} v & \text{for} \quad y > z \\ w & \text{for} \quad y = z \\ x & \text{for} \quad y < z \end{cases} \tag{1}$$

$$Rd_n(x) = x \cdot 10^n + 100 \cdot (1 - 10^n) \tag{2}$$

$$Ex_n(x) = Rd_{-n}(x) \tag{3}$$

$$\Theta(r) = (1 + 10^{-r})^{-9} \tag{4}$$

$$\beta(r) = 9 \cdot \log_{10}(1 + 10^{-r}) \tag{5}$$

$$\Phi_e(c; r) = 100 \cdot \sqrt{1 + \frac{\log_{10}(c)}{\beta(r)}} \tag{6}$$

$$\Phi_0(c; r) = \Xi(\Phi_e(c; r); \Phi_e(c; r); 0; c; \Theta(r)) \tag{7}$$

$$\Phi_n(c; r) = Rd_n(\Phi_0(c; r)) \tag{8}$$

$$\Lambda_0(s; r) = 10^{\beta(r) \cdot \left(\left(\frac{s}{100}\right)^2 - 1\right)} \tag{9}$$

$$\Lambda_n(s; r) = \Lambda_0(Ex_n(s); r) \tag{10}$$

$$\delta(x) = -\log_{10}(1 - x) \tag{11}$$

$$\delta_s(x) = -\lfloor \log_{10}(1 - x) \rfloor \tag{12}$$

$$\chi(x) = \sum_{k=1}^{x} \left(\frac{9}{10^k} \right) = 1 - 10^{-x} \tag{13}$$

3.3 Explanation

3.3.1 Explanation of Functions

- $\Xi(v; w; x; y; z)$:
- $Rd_n(x)$:
- $Ex_n(x)$:
- $\Theta(r)$:
- $\beta(r)$:
- $\Phi_e(c; r)$:
- $\Phi_0(c; r)$:
- $\Phi_n(c; r)$:
- $\Lambda_0(s; r)$:
- $\Lambda_n(s; r)$:
- $\delta(x)$:
- $\delta_s(x)$:
- $\chi(x)$:

3.4 Outputs

3.4.1 Interpretation of outputs

3.5 Examples

There are several possible areas of application for the goldsmith functions. Some of these applications include the purity of precious metals, reliability, accuracy of AI algorithms, data fidelity, purity of silicon in the semiconductor industry and many more.
Below there are some example values.

- $99.999998\%\ gold \hat{=} 88.19r8 - 0\ gold$
- $99.99999999954\%\ silicon \hat{=} 69.92r12 - 0\ silicon$
- $10.0\%\ gold\ content\ in\ ore \hat{=} 79.43r0 - 0\ gold\ content\ in\ ore$
- $58.3\%\ gold\ content\ in\ 14k\ gold \hat{=} 60.91r1 - 0\ gold\ content\ in\ 14k\ gold$
- $93.0\%\ forgor \hat{=} 43.55r2 - 0\ forgor$
- $0.6\%\ copper\ content\ in\ ore \hat{=} 42.42r0 - 0\ copper\ content\ in\ ore$
- $99.5\%\ uptime \hat{=} 66.54r4 - 0\ uptime$

The general notation is given by the following standart.

- $[100 \cdot c]\%\ [quantity] \hat{=} [\Phi_n(c; r)]r[r] - [n]\ [quantity]$

The notation standard is intended for the use in various industries and is deliberatly kept concise.

4 Conclusions

text

5 Refrences

text

6 Appendices

text