FormulaEs

$$Sneddon's: hc = hmax_{corr} - \varepsilon\,(Pmax / S)$$

$$Projected\ Area\ of\ Contact\ at\ the\ contact\ depth\,(hc): Ap = a_0\,hc^2 + a_1\,hc$$
$$Example: a_0 = 24.56\ for\ ideal\ Berkovich\ \text{or}\ Vickers\ Indenters\,;\ a_1\ is\ for\ tip\ rounding$$

$$Reduced\ Elastic\ Modulus: E_R = (S_{hmax}\sqrt{(\pi)})/(2\sqrt{(Ap)})$$
$$note: The\ S_{hmax}\ is\ the\ slope\ at\ the\ maximum\ depth\ for\ the\ indentation.$$

$$Elastic\ Modulus\ of\ Sample: Es = (1 - Vs^2)/((1/E_R) - ((1 - Vi^2)/Ei))$$

$$Poisson's\ Ratio\ of\ Sample: Vs = \sqrt{(1 - Es\,(1/E_R - (1 - Vi^2)/Ei))}$$

Load: P = %alpha (h - hf)^m newline newline

Slope(dP/dh): S = %alpha m (h - hf)^(m - 1) newline newline

Machine Compliance Correction Factor (Cf): h_corr = h_i - Cf P_i newline newline

Sneddon's: hc = hmax_corr - %varepsilon (Pmax / S) newline newline

Projected Area of Contact at the contact depth (hc): Ap = a_0 hc^2 + a_1 hc newline
Example: a_0 = 24.56 for ideal Berkovich "or" Vickers Indenters; a_1 is for tip rounding newline newline

Reduced Elastic Modulus: E_R = (S_hmax sqrt(%pi)) / (2 sqrt(Ap)) newline
note: The S_hmax is the slope at the maximum depth for the indentation. newline newline

Elastic Modulus of Sample: Es = (1 - Vs^2) / ((1 / E_R) - ((1 - Vi^2) / Ei)) newline newline

Poisson's Ratio of Sample: Vs = sqrt(1 - Es (1/E_R - (1 - Vi^2) / Ei)) newline newline

Elastic Modulus of Indenter: Ei = (1 - Vi^2) / ((1 / E_R) - ((1 - Vs^2) / Es)) newline newline

Poisson's Ratio of Indenter: Vi = sqrt(1 - Ei (1/E_R - (1 - Vs^2) / Es)) newline newline