


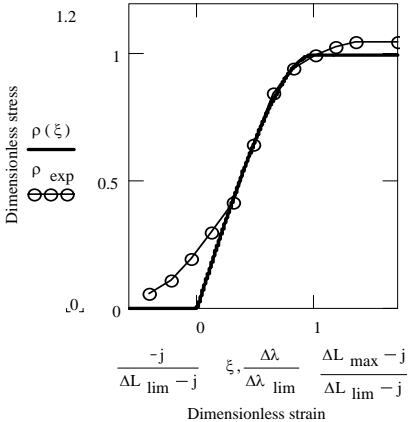
EXPERIMENTAL INVESTIGATIONS IN UNIAXIAL TENSION AND NUMERICAL SOLUTIONS FOR CURVE FITTING PART 2 – EXPERIMENTAL RESULTS

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Keywords: experimental mechanical characteristics, yielding stresses, elastic modulus

Abstract. The paper presents a method of understanding an experimental curve obtained during uniaxial tension test. The experimental curve is comparable to an analytical function, namely a conjugate hyperbola, described in part 1, [1]. The paper presents the experimental method and the curve fitting, as shown in Table 1. Subsequently, the yielding stresses are found and elastic moduli, secant modulus and tangent modulus are computed for some essential points from characteristic curve, with equations (1) and (2) respectively:

Table 1. Uniaxial tension test

Experimental equipment Probe and instruments	Matrix of experimental results: k , ΔL and F Experimental data and approximation curve																																					
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	<table style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <tr><td style="padding: 2px;">1</td><td style="padding: 2px;">5</td><td style="padding: 2px;">0.7</td></tr> <tr><td style="padding: 2px;">2</td><td style="padding: 2px;">10</td><td style="padding: 2px;">1.4</td></tr> <tr><td style="padding: 2px;">3</td><td style="padding: 2px;">15</td><td style="padding: 2px;">2.4</td></tr> <tr><td style="padding: 2px;">4</td><td style="padding: 2px;">20</td><td style="padding: 2px;">3.7</td></tr> <tr><td style="padding: 2px;">5</td><td style="padding: 2px;">25</td><td style="padding: 2px;">5.2</td></tr> <tr><td style="padding: 2px;">6</td><td style="padding: 2px;">30</td><td style="padding: 2px;">8.0</td></tr> <tr><td style="padding: 2px;">7</td><td style="padding: 2px;">35</td><td style="padding: 2px;">10.5</td></tr> <tr><td style="padding: 2px;">8</td><td style="padding: 2px;">40</td><td style="padding: 2px;">11.7</td></tr> <tr><td style="padding: 2px;">9</td><td style="padding: 2px;">45</td><td style="padding: 2px;">12.4</td></tr> <tr><td style="padding: 2px;">10</td><td style="padding: 2px;">50</td><td style="padding: 2px;">12.8</td></tr> <tr><td style="padding: 2px;">11</td><td style="padding: 2px;">55</td><td style="padding: 2px;">13.0</td></tr> <tr><td style="padding: 2px;">12</td><td style="padding: 2px;">65</td><td style="padding: 2px;">13.0</td></tr> </table>	1	5	0.7	2	10	1.4	3	15	2.4	4	20	3.7	5	25	5.2	6	30	8.0	7	35	10.5	8	40	11.7	9	45	12.4	10	50	12.8	11	55	13.0	12	65	13.0	
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$$\rho(\xi) = \left[1 - (\sqrt{\alpha^2 + (1-\xi)^2} - \alpha)(\sqrt{\alpha^2 + 1} - \alpha)^{-1} \right] \Phi[\xi(1-\xi)] + \Phi(\xi - 1), \quad (1)$$

$$E_{tan} = \frac{d\sigma}{d\varepsilon} = E_{lim} \frac{d\rho}{d\xi} = E_{lim} \frac{1-\xi}{\sqrt{\alpha^2 + (1-\xi^2)}\sqrt{\alpha^2 + 1} - \alpha}. \quad (2)$$

where ρ is the dimensionless stress, Φ is the step function and α is a parameter numerically found.

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