Birefringent Material-Based Optical Scales

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Abstract. Based on the knowledge of polycarbonate (PC) birefringence obtained from our previous studies, we designed and realized a scales prototype that can determine the magnitude of the load based on the evaluation of the birefringence of the loaded polycarbonate element. The individual mechanical parts of the scales were manufactured using a 3D printer and combined into one compact unit. After assembling the scales, its calibration was performed by measuring the dependence of the intensity of light passing through the PC element on its load. In this paper, we report the design and realization of the scales and demonstrate their functionality.