Glòria Casanellas (Horizons Optical)

Title: Optimization methods for the design of progressive lenses

Abstract: The lens is the transparent part of the eye behind the pupil that helps humans to see clearly by focusing light onto the retina. Over time, the lens loses some of its elasticity and therefore can no longer accommodate clearly for near vision. This phenomenon is called presbyopia and explains why people need reading glasses as they become older. Progressive lenses correct presbyopia and have a complex design: they have an upper region for far vision, a low region for near vision (reading), and a corridor that connects these areas which allows clearly vision at an intermediate distance, for example, when looking at a computer screen. In this talk we will present two different models for computing progressive lenses. Both models are highly nonlinear, nonconvex and continuous and were solved using the AMPL modeling language and the interior point solvers IPOPT, LOQO and KNITRO. This talk is part of an Industrial Doctorate developed through a partnership agreement between the Universitat Politècnica de Catalunya and the company Horizons Optical.