"Penalized Least Squares Smoothing of Two–Dimensional Mortality Tables with Imposed Smoothness"

This paper presents a method useful to impose a percentage of smoothness when smoothing two-dimensional mortality tables via Penalized Least Squares. We can decide at the outset a desired percentage of smoothness to impose in the dimension of age, the dimension of year or both, in order to obtain comparable smoothed mortality trends, for different datasets. Since the smoothing method is mainly determined by two smoothing parameters, we employ some indices that relate those parameters to the percentages of smoothness. We define a smoothness index for the one-dimensional case and generalize it to the two-dimensional one. For illustrative purposes, we apply the proposed method to data from the Continuous Mortality Investigation Bureau of the UK. The numerical examples are useful to appreciate that different log-mortality patterns can be obtained when marginal smoothness changes, but the joint percentage of smoothness stays fixed. Thus, emphasizing the fact that, in practice, we should care about marginal as well as joint smoothness.

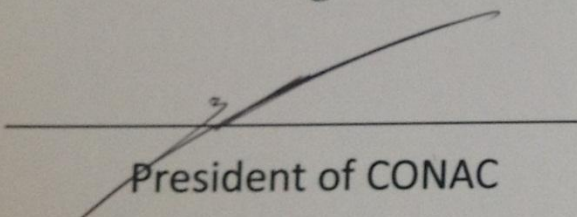The IAALS Section of the International Actuarial Association awards to

Eliud Silva
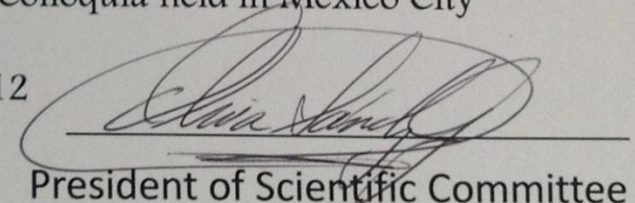
this certificate of participation with the paper:

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During the ASTIN, AFIR/ERM and IAALS Colloquia held in Mexico City

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President of CONAC

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President of Scientific Committee