Fredholm integral equations on the real semiaxis: a numerical method

G. Mastroianni and I. Notarangelo
Department of Mathematics, Computer Sciences and Economics,
University of Basilicata
viale dell'Ateneo Lucano 10, 85100 Potenza, Italy
giuseppe.mastroianni@unibas.it

In this talk we consider Fredholm integral equations of the form

$$f(x) + \mu \int_0^\infty k(x,y) f(y) w(y)\, \mathrm{d}y = g(x)\,, \qquad x \in (0,\infty)\,, \tag{1}$$

where $w(y) = \mathrm{e}^{-\frac{1}{y^\alpha} - y^\beta}$, $\alpha > 0$, $\beta > 1$, $\mu \in \mathbb{R}$, and the given functions k and g are continuous and exponentially monotonic at the endpoints of the interval $(0,\infty)$.

We approximate the solution of (1) by using a Nyström method, which we prove to be stable and convergent. The theoretical background of the method (i.e. the main difficulty) is the construction of new function spaces connected to the weight w and the related estimates of the error of best polynomial approximation (see [1]).

References

[1] G. Mastroianni and I. Notarangelo, *Polynomial approximation with an exponential weight on the real semiaxis*, to appear in Acta Mathematica Hungarica.