PROPERTIES OF GENERALISED TRIGONOMETRIC FUNCTIONS

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Abstract. (motto: *Etwas allgemein machen heisst, es denken.* G.W.F. Hegel)
Let us consider the following eigenvalue problem

$$\left.\begin{array}{r} \Delta_p u + \lambda |u|^{q-2} u = 0 \quad \text{on } (0,1), \\ u(0) = 0, u(1) = 0, \end{array}\right\} \tag{1}$$

where $\Delta_p u = (|u'|^{p-2}u')'$. All eigenfunctions u_n of this problem can be generated by generalised trigonometric functions $\sin_{p,q}(n\pi_{p,q}t)$ which can be also seen as extremal functions for the classical Hardy operator acting between L^p and L^q spaces.

We will focus in this talk on study of properties and relations of the generaliesed trigonometric functions $\sin_{p,q}$, $\cos_{p,q}$, $\tan_{p,q}$, and also on their relation with s-numbers, Approximation Theory and other areas of analysis. Generalisation of (1) for spaces with variable exponents will also be considered.

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Key words and phrases. Generalised Trigonometric functions, s-numbers, Approximation Theory, p-Laplacian, eigenvalues.