
SEMINARIO DE ANÁLISIS NUMÉRICO Y MODELACIÓN MATEMÁTICA

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Resumen

Expansions in orthogonal bases are excellent means of approximating smooth functions in simple domains such as intervals and cubes, but there are many problems in numerical approximation where constructing good orthonormal bases is difficult or infeasible. In this talk, we will introduce certain non-orthogonal expansions known as frames, which are a promising alternative for such problems. We will explain what frames are, how to construct them in a general setting, and describe the conjectures in which we were working those two months. While frames are well-known tools in image and signal processing, coding theory and other areas of applied mathematics, their use in numerical analysis is far less widespread. This is a project that the research group of professor Ben Adcock has been working on for several years. After this we will introduce another completely different type of problem, which deals with the approximation of the solution to the steady neutron transport equation using classical half-space equations: a regularization procedure based on a small modification of the incoming data must be applied, and hence we need to analyse whether this change still leads to a good approximation of the original solution. We explain the motivation behind this problem and our current challenges towards a final result.