QUANTITATIVE PHOTOACOUSTICS USING THE TRANSPORT EQUATION

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Resumo/Abstract:

Quantitative photoacoustic tomography involves the reconstruction of a photoacoustic image from surface measurements of photoacoustic wave pulses followed by the recovery of the optical properties of the imaged region. The latter is, in general, a nonlinear, ill-posed inverse problem, for which model-based inversion techniques have been proposed. Here, the full radiative transfer equation is used to model the light propagation, and the acoustic propagation and image reconstruction solved using a pseudo-spectral time-domain method. Direct inversion schemes are impractical when dealing with real, three-dimensional images. In this talk an adjoint field method is used to efficiently calculate the gradient in a gradient-based optimisation technique for simultaneous recovery of absorption and scattering coefficients.

Joint work with B. Cox, T. Saratoon, T. Tarvainen.