

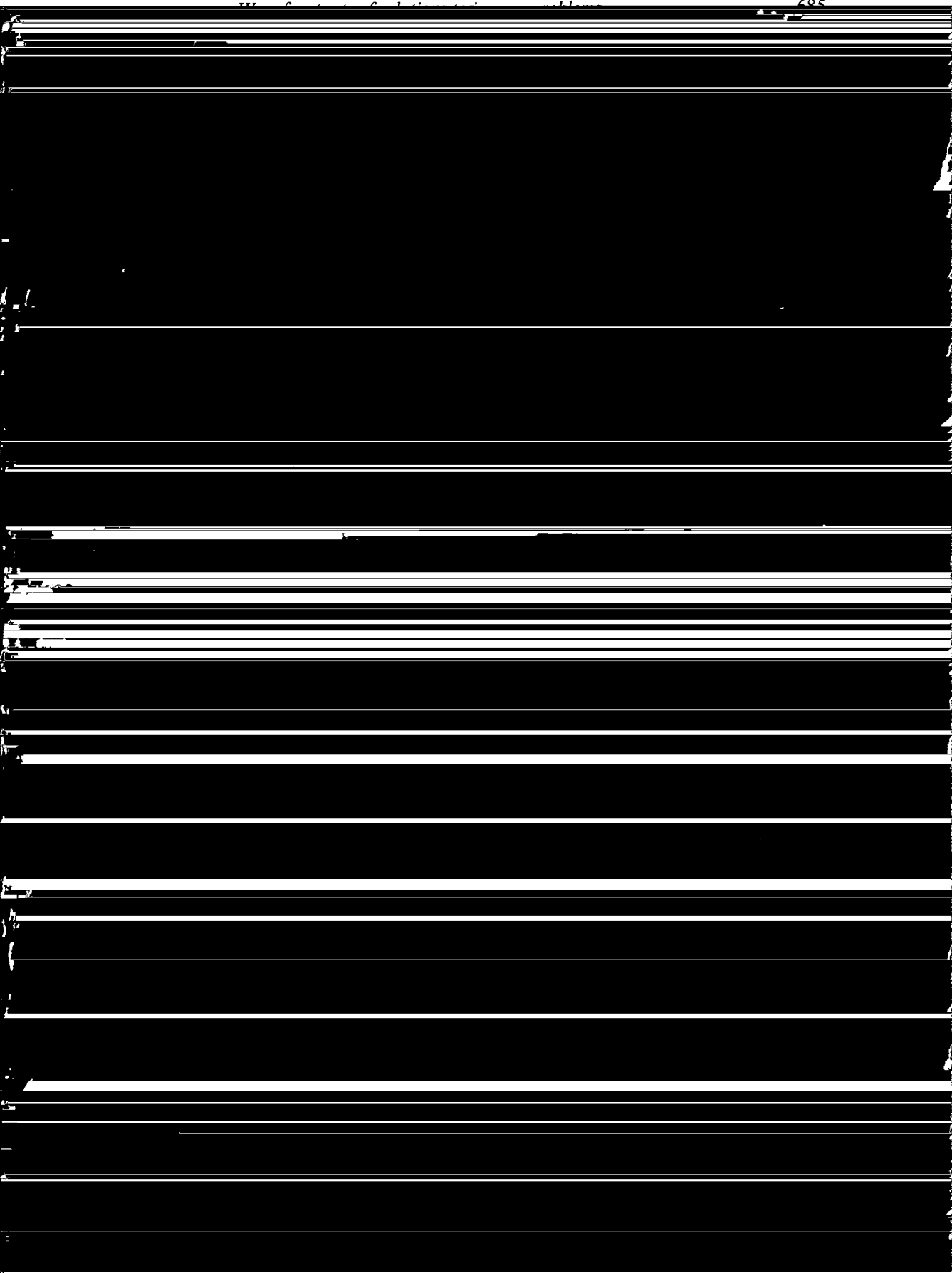
Wavefront sets of solutions to linearised inverse scattering problems

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In [10] precise answers to these questions are given using the notion of a generalised Radon transform [23]. In particular the answer is affirmative to the first question.



satisfying the eikonal equation

$$|\nabla_x \varphi(x, \xi)|^2 = n_0^2(x) \quad (3.2)$$

for $x \in X$, and $\xi \in \partial X$, such that

$$\varphi(x, \xi) \rightarrow 0 \quad \text{as } x \rightarrow \xi. \quad (3.3)$$

We also assume that $\varphi(x, \xi)$ satisfies conditions (2.1), (2.2). For example if $n_0(x)$ is constant, say $n_0(x) = 1$ — the constant background model — we have

states that the locations of discontinuities together with their infinitesimal directions can be (at least partially) recovered. In fact the migration schemes described in [13–21] all have various choices for B , motivated in simple cases (e.g. a constant background) by some kind

Appendix

Here we state the basic facts about pseudodifferential operators. Let X be an open set of R^n .

Definition (cf [7] vol. 1, p 13). The space of symbols of degree m , denoted by

$$S^m(X \times X \times R^n \setminus \{0\})$$

consists of all complex-valued functions

$$C(x, y, \theta) \in C^\infty(X \times X \times R^n \setminus \{0\})$$

where

$$p = \nabla_x \Phi(x, x, \theta).$$

Since the determinant factor is non-zero and positive homogeneous degree 0 in p , we conclude that T is elliptic at (x_0, p_0) if

$$|C(x, x, \theta)| \geq d|\theta|^m$$

for all (x, θ) in some conic neighbourhood of (x_0, θ_0) where

$$p_0 = \nabla_x \Phi(x_0, x_0, \theta_0)$$

and d is some positive constant. From this we get the following corollary.

Corollary A.2. Let $Tf = g$ be as in proposition A.1, then

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