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A groupoid approach to pseudodifferential operators

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The tangent groupoid is a geometric device for glueing a pseudodifferential operator to its principal symbol via a deformation family. We will discuss a converse to this: briefly, pseudodifferential kernels are precisely those distributions that extend to distributions on the tangent groupoid that are essentially homogeneous with respect to the natural R+-action. One could see this as a simple new definition of a classical pseudodifferential operator. Moreover, we will show that, armed with an appropriate generalization of the tangent groupoid, this approach allows us to easily construct more exotic pseudodifferential calculi, such as the Heisenberg calculus. (Joint work with Erik van Erp.)

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