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Effects of the realistic media models on the computational algorithms for the 3D PSDM

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From the hierarchical structure the geophysical processes follow that some methods of solid mechanics can be applied to geological scale of length. It cause possibility to take the seismic rays path optical length as the function of the *local* internal structure of the media. The optical length can be function of the internal metric, $dl = g_{ij}x^i x^j$, where g_{ij} is the metric tensor of the media. In classical model of the ideal media this tensor is diagonal and the length is Euclidean. In real inhomogeneous media this tensor is essentially non-Euclidean and length has more complex structure. The internal defect structure cause the Cartan curvature and torsion of the continuum.

The local curvature and torsion are the single-valued tensorial functions of the given set and kinds of defects, presented in the continuum and total phase difference $\Delta\phi$ can be found as the sum of partial difference ϕ_i on the separate defects. By this interpretation the seismic signals velocities v_g and v_s are essentially different.

This difference cause necessity the scattering field surface construction algorithm modification. The some details of the algorithm are proposed. Connection the rays trajectory curvature with real defects are evaluated. Identification of the defects can be realised by the analysis of higher order harmonics. It is very heavy computation problem but with possible effective parallel decomposition for grid computing.