HW 9 (20 points) - To be handed by Friday, 8 Nov in the class or by email

1. (10 points) Determine the cut locus of an arbitrary point on a flat torus whose lattice is $\mathbb{Z}e_1 + \mathbb{Z}e_2 + \ldots$.

2. (10 points) Let (M, g) be a Riemannian manifold, and $\gamma : [a, b] \to M$ a geodesic. Prove that there for every pair of tangent vectors $v, w \in T_{\gamma(a)}M$, there exists a unique Jacobi field along γ with $J(a) = v, J(b) = w$ if and only $\gamma(a)$ and $\gamma(b)$ are not conjugate to each other.