

Traditional Greek dances greatly differ by region

Crete is fast, Epirus is fluid, Pontos uses hands too

Daedalus keeps dancing: Finding regional differences and variations between dancers of traditional Greek dances with motion capture

Background: In 2022, a pilot study with 6 traditional Greek dances from 3 regions (Crete, Epirus & Pontos), recorded with one semi-professional dancer (n=18) was presented. Regional differences could be shown in some parameters, like velocity, travel distance or hip-shoulder rotation. The study was limited by the choice of music (only one piece per dance) and having only once dancer recorded. The new dataset consists of 5 dances from each of the same 3 regions, in 2 different versions (music), recorded with 7 semi-professional dancers with at least 15 years of expertise (n = 210). With this data, that will be even more extended in the future, the influence of the dancer or choice of music can be controlled.

Motion Capture

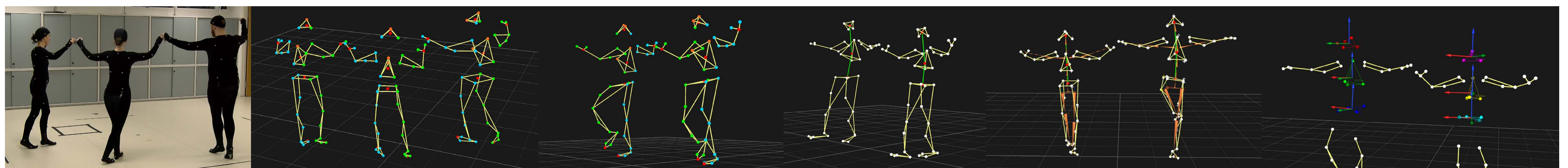
MATLAB

MoCap-Toolbox

JASP

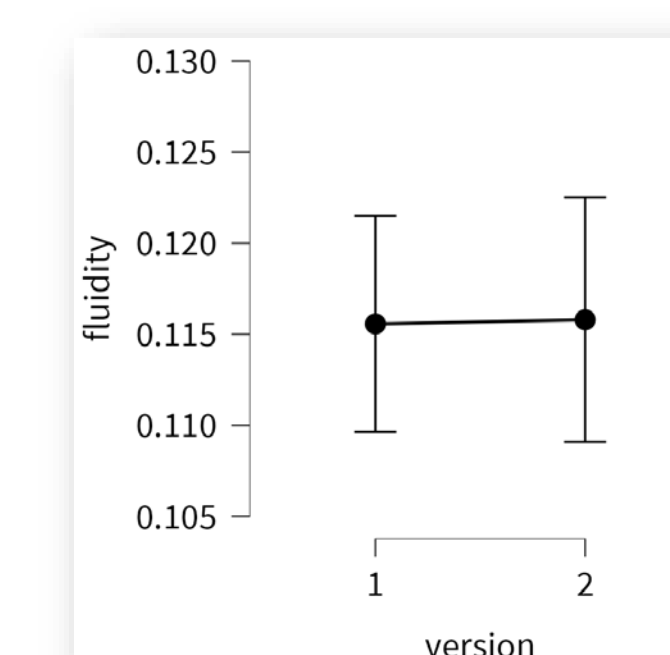
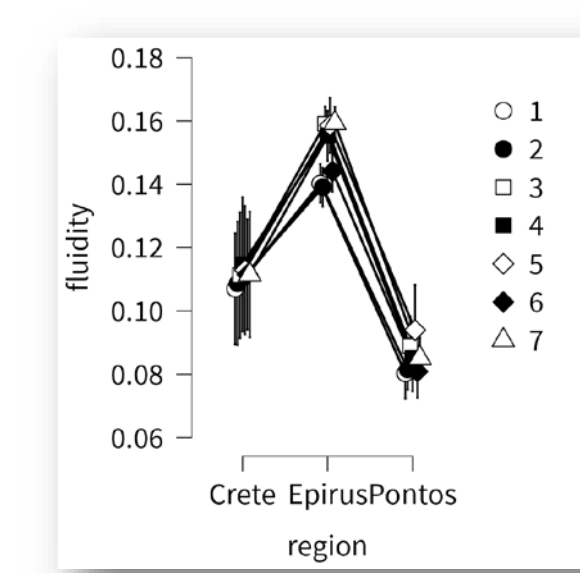
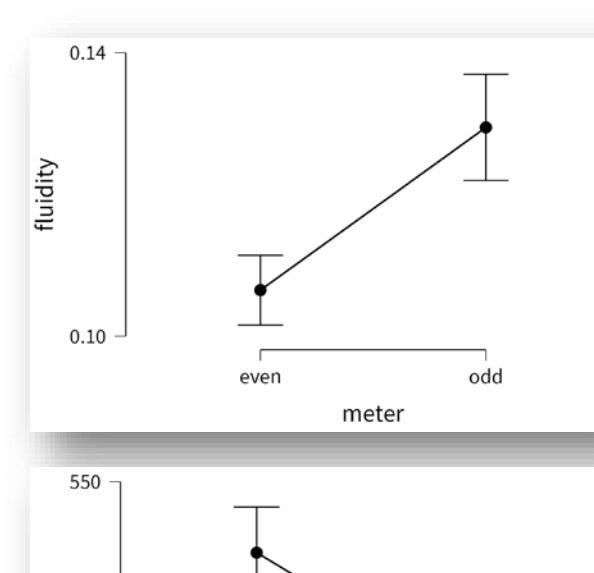
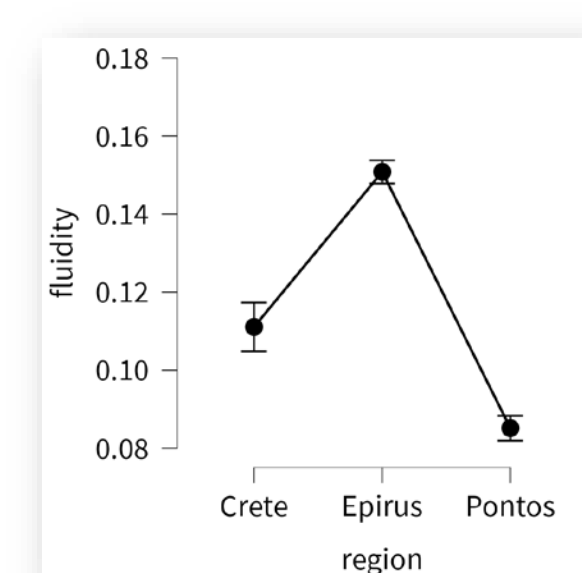
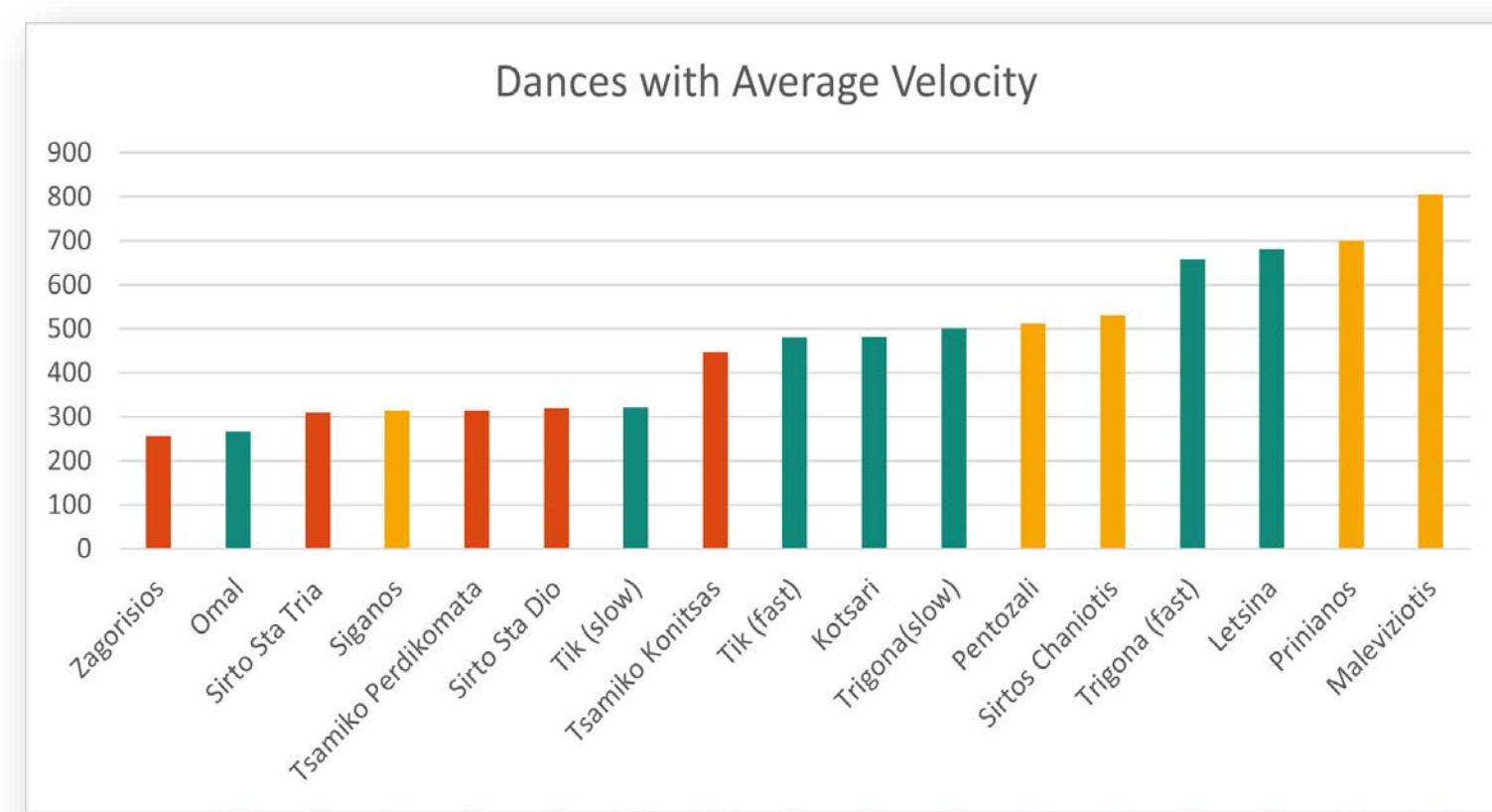
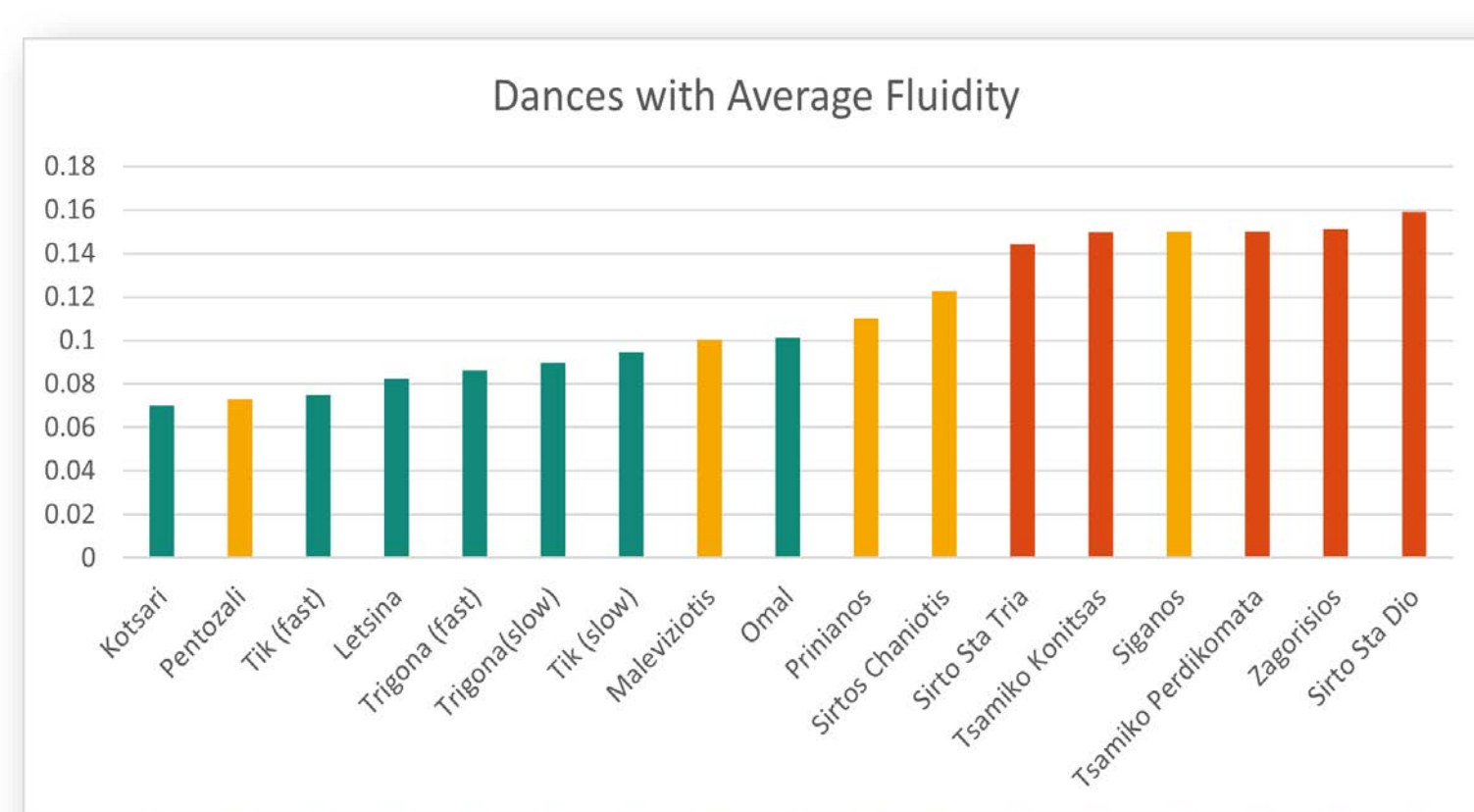
92.610.000 Values

Dataset & Parameters: Data was recorded with a Qualisys motion capture system of 14 cameras at 100 Hz sample rate using the animation marker set (42) and additional virtual markers for body parts (7). 30 seconds of each dance were isolated for analysis. Using the Mocap-Toolbox (Burger & Toivanen 2013) in MATLAB, *complexity*, *fluidity*, *velocity*, *acceleration* and *travel distance* were calculated for the full body and specific body parts (head, torso, hip, hands, feet).



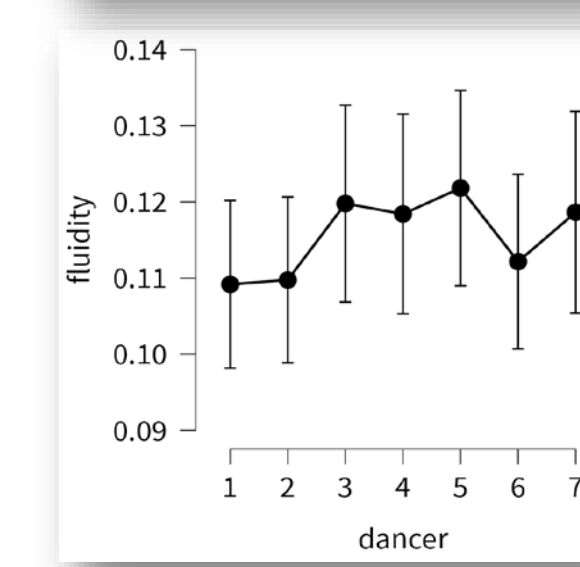
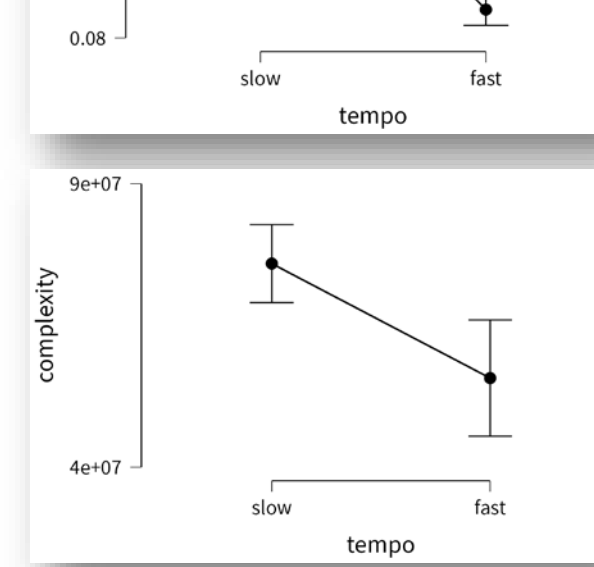
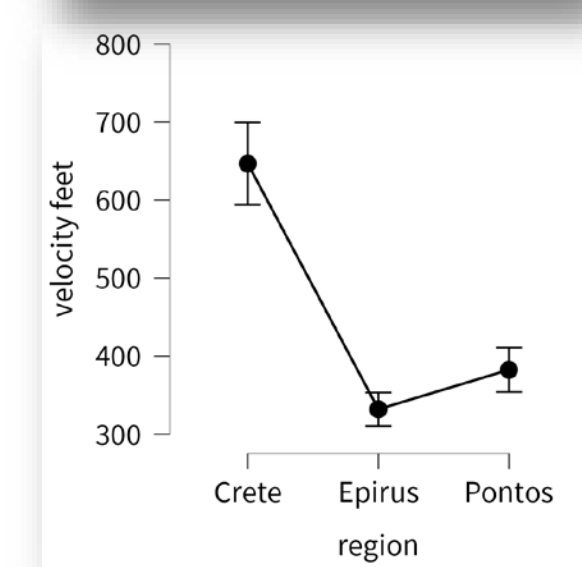
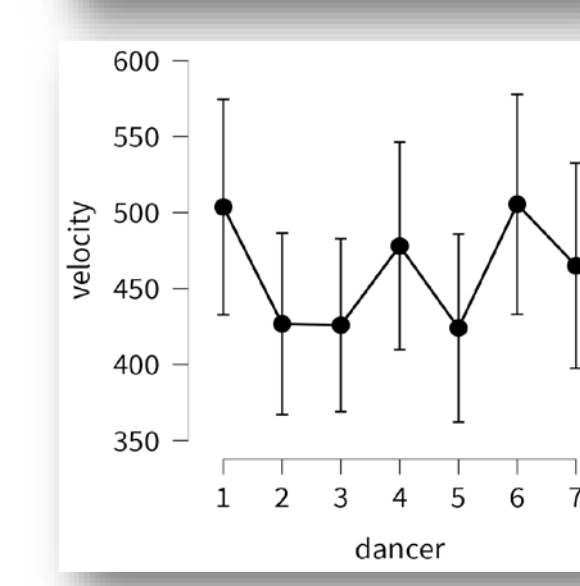
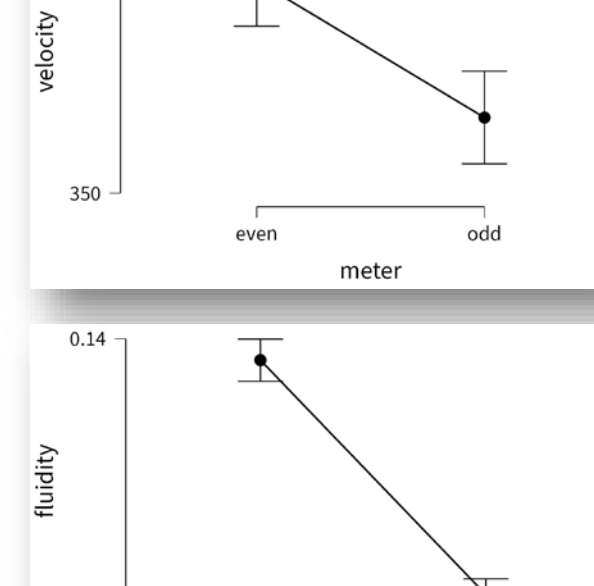
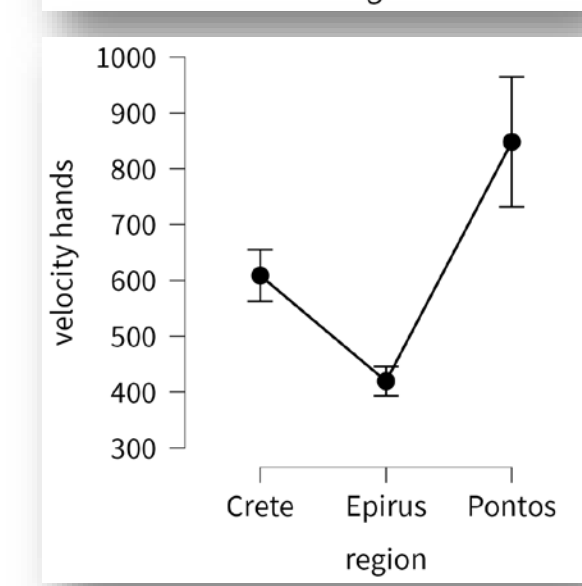
Result 1: Significant differences in region, meter and tempo could be seen in the new dataset.

Result 2: No significant general differences between choice of music or dancer were found.



	t	df	p	Cohen's d
complexity	-1.183	208	0.238	-0.163
fluidity	-0.050	208	0.960	-0.007
velocity	-0.583	208	0.560	-0.080
acceleration	-0.844	208	0.400	-0.116
traveldistance	-0.598	208	0.550	-0.083

Note. Student's t-test.



1 Epirus dances are highest in **fluidity** (ANOVA $F=226.9$, $p<.001$, $\eta^2=0.687$) while the other two regions score high in **velocity** (ANOVA $F=49.7$, $p<.001$, $\eta^2=0.325$), **Crete** especially in feet- and **Pontos** in hand-movement. Dances with odd time signatures are more fluid ($d=0.747$, $p<.001$) and slower ($d=0.567$, $p<.001$). Fast dances by classification are way less fluid ($d=2.26$, $p<.001$) and slightly less complex ($d=0.475$, $p<.001$). 2 ANOVAs and T-Tests show no significant differences between music versions or dancers, however the first dancer had the fastest overall movement in all 3 recordings (expected).

Discussion: Regional differences could be confirmed with the expanded dataset, especially with the added parameter of fluidity (ratio of velocity to acceleration in movements). Classified tempo matches calculated velocity in dances, where odd and even time signatures differ. Torsional rotations and hip-shoulder movements show the same patterns as in the pilot but are not fully analyzed yet. Differences between dancers are not significant for the global variables, however, there are lots of specific movement patterns of the feet that will be analyzed in depth in a follow-up study.

Limitations: The Greek dance tradition is not limited to the studied regions, and the selected dances hardly cover the diversity of the tradition. Similarities of patterns between dances/dancers require dynamic time warping analyses and inter-dancer variations require a closer look into specific body segments. There is hardly any basis to rely on when it comes to motion capture studies in such a specific dance tradition, many concepts have yet to be established.

Reference: Burger, B. & Toiviainen, P. (2013). MoCap Toolbox - A Matlab toolbox for computational analysis of movement data. In R. Bresin (Ed.), Proceedings of the 10th Sound and Music Computing Conference, (SMC). Stockholm, Sweden: KTH Royal Institute of Technology.



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