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Streamline and vorticity topology of eruption from a boundary layer induced by a 2D vortex patch MORTEN ANDERSEN, MORTEN BRONS, Technical University of Denmark, Department of Mathematics, MARK THOMPSON, Monash University, Mechanical and Aerospace Engineering — We investigate the flow field generated by a vortex patch near a wall. Secondary vortices are created and boundary layer eruption may occur for increasing time or Reynolds number. The stream line topology and the vorticity topology are investigated and compared motivated by the work of Kudela & Malecha, Fluid Dyn. Res. 2009. Keeping track of vortices is a widely used procedure to explain "what is going on" in a fluid. However, different measures may be used for identifying a vortex. We will compare two of them under simplified conditions namely in the case of two dimensional incompressible flow with constant third component of the velocity vector. In the vorticity formulation a vortex is identified as an extremum of the vorticity. In the stream function formulation, if an elliptic fixed point exists then a vortex exists. The coordinate system is moving with constant speed equal to the generating vortex speed in inviscid flow. We find that vortex creation occur by saddle - node bifurcations in the streamlines, not by pinching off as suggested by Kudela & Malecha. Close to the creation of vortices, good agreement between the vorticity structure and the streamline topology is observed. At later stages, this may break down and streamline centers may disappear even though a vor

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