This paper presents a method for stabilizing both cylindrical and spherical panorama videos with a 360-degree field of view. Our method decouples the rotation from other motions and applies different strategies for smoothing them. The proposed approach is 2.5D as it estimates 3D rotations without involving 3D structure-from-motion methods. It is more robust and can be performed in an incremental way.

### Overview of the proposed method

1. **Orientation estimation**
   - Input video
   - First stage: tilt correction, orientation estimation
   - Second stage: trajectory smoothing, orientation assignment, warped meshes
   - Output video

2. **Trajectory smoothing**
   
   \[ E(V) = E_d(V) + \lambda E_t(V) \]

### Camera models

1. **(a) Bundle camera path**
2. **(b) The proposed method**
3. **(c) The proposed method with tilt correction**
4. **(d) The influence of camera rotation**

### Results

- **Bundle camera path**
- **The proposed method**
- **With tilt correction**
- **Results for cylindrical videos.**
- **Original video**
- **Our results**
- **With tilt correction**
- **Results for spherical videos.**