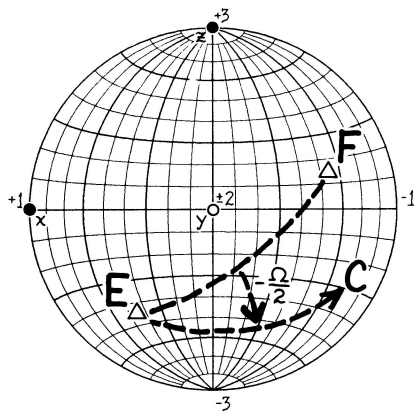


Box 7-4. How to Add Rotations Graphically

In plate tectonics we commonly need to make several rotations in succession. Let's assume that we first make the rotation $\text{ROT}[\mathbf{E}, \Omega]$ and that we then make the rotation $\text{ROT}[\mathbf{F}, \Omega']$. We want to find the single rotation that would have the same final result as these two successive rotations. Symbolically we describe the equivalent single rotation as $\text{ROT}[\mathbf{P}, \Omega_T] = \text{ROT}[\mathbf{E}, \Omega] + \text{ROT}[\mathbf{F}, \Omega']$. We will keep our reference coordinates fixed relative to plate A.



- Plot **E, F**

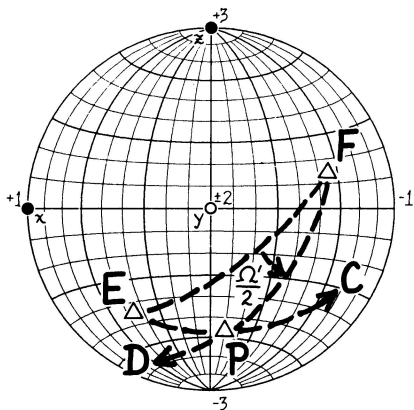
These are the two Euler poles.

- Draw **<E, F>**

This is the great circle through **E** and **F**.

- Draw **<E, C>**

Construct this great circle so that it passes through **E** and makes an angle $\Omega/2$ with **<E, F>**. This great circle can be found by rotating **<E, F>** by an angle $-\Omega/2$ around **E**. Remembering our sign convention, if Ω is positive then $-\Omega/2$ is negative and the rotation is clockwise, as shown above. **C** serves to designate or identify the great circle and is not used explicitly in the construction.



(continued)