Problem 2

(5 points): Find $\text{proj}_{\mathbf{u}}\mathbf{v}$.

p.g. 851

$$\text{proj}_v u = \left(\frac{u \cdot v}{|v|^2}\right) v$$

$$\Rightarrow \text{proj}_u v = \left(\frac{v \cdot u}{|u|^2}\right) u$$

$$= \frac{\langle 5,-1,3\rangle \cdot \langle -1,2,1\rangle}{\left(\sqrt{-1^2+2^2+1^2}\right)^2}$$

$$= \frac{-5-2+3}{6}$$

$$= \frac{-4}{6}$$

$$= \boxed{\frac{-2}{3}}$$