5.14 Equation 5.69 gives us:

$$\frac{\partial E_n}{\partial w_{ji}} = \frac{E_n(w_{ji}+\epsilon) - E_n(w_{ji}-\epsilon)}{2\epsilon} + O(\epsilon^2)$$

Applying Taylor expansion to E_n, evaluated at w_{ji}, we get:

$$E_n(x) = E_n(w_{ji}) + \frac{E'_n(w_{ji})}{1!}(x - w_{ji}) + O(x - w_{ji})^2$$

Evaluating the expression at $w_{ji} + \epsilon$, we get

$$E_n(w_{ji}+\epsilon) = E_n(w_{ji}) + \frac{E'_n(w_{ji})}{1!}(w_{ji}+\epsilon - w_{ji})$$
$$+\frac{E''_n(w_{ji})}{2!}(w_{ji}+\epsilon - w_{ji})^2 + O(w_{ji}+\epsilon - w_{ji})^3$$

$$= E_n(w_{ji}) + \epsilon E'_n(w_{ji}) + \frac{E''_n(w_{ji})}{2}(\epsilon)^2 + O(\epsilon)^3$$

Evaluating the expression at $w_{ji} - \epsilon$, we get

$$E_n(w_{ji}-\epsilon) = E_n(w_{ji}) + \frac{E'_n(w_{ji})}{1!}(w_{ji}-\epsilon - w_{ji})$$
$$+\frac{E''_n(w_{ji})}{2!}(w_{ji}-\epsilon - w_{ji})^2 + O(w_{ji}-\epsilon - w_{ji})^3$$

$$= E_n(w_{ji}) - \epsilon E'_n(w_{ji}) + \frac{E''_n(w_{ji})}{2}(\epsilon)^2 - O(\epsilon)^3$$

Substituting in 5.69, we get

$$\frac{\partial E_n}{\partial w_{ji}} = \frac{1}{2\epsilon}\Bigg(E_n(w_{ji}) + \epsilon E'_n(w_{ji}) + \frac{E''_n(w_{ji})}{2}(\epsilon)^2 + O(\epsilon)^3$$
$$-E_n(w_{ji}) + \epsilon E'_n(w_{ji}) - \frac{E''_n(w_{ji})}{2}(\epsilon)^2 + O(\epsilon)^3\Bigg) + O(\epsilon^2)$$

$$= \frac{1}{2\epsilon}\left(2\epsilon E'_n(w_{ji}) + 2O(\epsilon)^3\right) + O(\epsilon^2)$$

$$= E'_n(w_{ji}) + O(\epsilon)^2$$

(by folding all $O(\epsilon)^2$ terms into one term).

We can see that the terms that are $O(\epsilon)$ cancel on the R.H.S.