start with final equation for Δp in Box 5.3 in Freeman, S. and J. C. Herron. 2003. *Evolutionary Analysis* (3rd edition), Prentice Hall, New York:

$$\Delta p = p\,(p\,w_{11} + q\,w_{12} - \underline{w}) / \underline{w}$$

$$\Delta p = p\,(p\,w_{11} + q\,w_{12} - p^2\,w_{11} - 2pq\,w_{12} - q^2\,w_{22}) / \underline{w}$$

$$\Delta p = p\,(w_{11}\,(p - p^2) + w_{12}\,(q - 2pq) - w_{22}\,q^2) / \underline{w}$$

$$\Delta p = p\,(w_{11}\,p\,(1 - p) + w_{12}\,q\,(1 - 2p) - w_{22}\,q) / \underline{w}$$

$$\Delta p = p\,(w_{11}\,p\,q + w_{12}\,(q - p) + w_{22}\,q^2) / \underline{w}$$

$$\Delta p = p\,q\,(w_{11}\,p + w_{12}\,(q - p) + w_{22}\,q) / \underline{w}$$

equivalent to equation 5.10 in Halliburton, R. 2004. *Introduction to Population Genetics*. Peasrson Prentice Hall, Upper Saddle River.