Classical Invariant Theory(Peter J.Olver),Exercise 1.3

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Exercise (1.3)**.** *Suppose Q and $\overline{Q}$ are related by an affine change of variables (1.5).Determine how their discriminants and leading coefficients are related.*

Solve. $\tilde{p} = \alpha p + \beta$.So

$$\widetilde{Q}(\tilde{p}) = a\tilde{p}^2 + (-2a\beta + 2b\alpha)\tilde{p} + a\beta^2 - 2\alpha\beta b + c\alpha^2.$$

Then the discriminant of $\widetilde{Q}(\tilde{p})$ is $4\alpha^2(b^2 - ac)$. □

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