

Probability 1
CEU Budapest, fall semester 2016
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Homework sheet 5 – due on 14.11.2013 – and exercises for practice

5.1 Durrett [1], Exercise 5.1.1

5.2 Durrett [1], Exercise 5.1.3

5.3 (**homework**) Durrett [1], Exercise 5.1.4

5.4 Durrett [1], Exercise 5.1.6

5.5 (**homework**) Let X and Y be independent standard Gaussian random variables. Let $U = X + Y$ and $V = 2X - Y$. Calculate $\mathbb{E}(V|U)$. (*Hint: Example 5.1.2 says that if W is independent of U , then $\mathbb{E}(W|U) = \mathbb{E}W$. If you choose $\lambda \in \mathbb{R}$ cleverly, then $W := V - \lambda U$ will be independent of U . (Since U and W are jointly Gaussian, to show independence it's enough to check that $\text{Cov}(U, W) = 0$.) Then write $V = \lambda U + W$.)*

5.6 Durrett [1], Exercise 5.1.8

5.7 Durrett [1], Exercise 5.1.9

5.8 (**homework**) Durrett [1], Exercise 5.1.10

5.9 (**homework**) Durrett [1], Exercise 5.1.11

References

[1] Durrett, R. *Probability: Theory and Examples*. **4th** edition, Cambridge University Press (2010)