7.2: Polynomial Rings, Matrix Rings, and Group Rings

Alex L.

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1 Motivation

We want to introduce three useful types of rings: Polynomial Rings, Matrix Rings, and Group Rings.

2 Content

2.1 Polynomial Rings

Definition: (Polynomial Rings) A polynomial ring $R[x]$ is a ring with members r of the form

$$r = a_n x^n + a_{n-1} x^{n-1} + a_{n-2} x^{n-2} + ... + a_1 x + a_0$$

where $a_0, a_1, ..., a_n$ are real numbers with standard addition of like terms and multiplication of polynomials. Its pretty easy to see that this is a ring.

Notice that the ring of real numbers R is a subring of $R[x]$, when the highest degree is degree zero.