

THE GAUSS-MANIN CONNECTION REVISITED

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Abstract: To a smooth map of smooth (complex) varieties one can associate a connection on the relative cohomology of the map. This so-called Gauss-Manin connection gives rise to natural differential equations in the target of the map. In this way, for example, arises the Picard-Fuchs equation for the periods of a family of elliptic curves, which is a special type of the Gauss hypergeometric equation. The standard construction of the GM-connection, due to Katz and Oda (1968), is by a spectral sequence induced by a filtration of the total de Rham complex. We will construct the connection in a more direct way without spectral sequences.