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# KP theory, total positivity and rational degenerations of M-curves

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We establish connections between two objects, naturally arising in the theory of the Kadomtsev-Petviashvily equation: totally nonnegative Grassmannians and rational degenerations of the M-curves (Riemann surfaces with an antiholomorphic involution and the maximal possible number of real ovals) with a collection of marked points.

More precisely, we show that a KP divisor satisfying the reality conditions on a degenerate M-curve is canonically associated to any point in the totally non−negative Grassmannian.

In the case of a certain rational degeneration of hyperelliptic M-curves, we also solve the inverse problem and explain the connection to the finite Toda system.

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