1011-94-135 **Pascal O Vontobel*** (vontobel@ece.wisc.edu), 3356 Engineering Hall, 1415 Engineering Drive, Madison, WI 53706, and **Ashwin Ganesan** (ganesan@cae.wisc.edu), 3612 Engineering Hall, 1415 Engineering Drive, Madison, WI 53706. *An Explicit Construction of Universally Decodable Matrices.*

Universally decodable matrices (UDMs) can be used for coding purposes when transmitting over slow fading channels. These matrices are parameterized by positive integers L and n and a prime power q: L matrices $\mathbf{A}_0, \ldots, \mathbf{A}_{L-1}$ over $\mathbb{F}_q$ and size $n \times n$ are (L, n, q)-UDMs if for every non-negative integers $k_0, \ldots, k_{L-1}$ with $k_0 + \cdots + k_{L-1} \geq n$ they fulfill the UDMs condition which says that the $(\sum_{\ell=0}^{L-1} k_\ell) \times n$ matrix composed of the first k_0 rows of $\mathbf{A}_0$, the first k_1 rows of $\mathbf{A}_1$, …, the first k_{L-1} rows of $\mathbf{A}_{L-1}$ has full rank. Based on Pascal's triangle we give an explicit construction of universally decodable matrices for any non-zero integers L and n and any prime power q where $L \leq q + 1$. This is the largest set of possible parameter values since for any list of universally decodable matrices the value L is upper bounded by $q + 1$, except for the trivial case $n = 1$. For the proof of our construction we use properties of Hasse derivatives, and it turns out that our construction has connections to Reed-Solomon codes, algebraic-geometry codes, and so-called repeated-root cyclic codes. (Received August 22, 2005)