Meeting: 1003, Atlanta, Georgia, AMS CP 1, AMS Contributed Paper Session

1003-05-1443 **Randy Maddox*** (randall.maddox@pepperdine.edu), Natural Science Division, 24255 Pacific Coast Hwy, Malibu, CA 90263. *Classifying pebble sets in convex polygons.* Preliminary report.

Suppose a convex n-gon P is given. It is known that there exists a set S of $n-2$ points in the interior of P so that for any three vertices of P, the interior of the triangle determined by the three vertices contains exactly one element of S. This is useful in proving some fixed point theorems and related theorems.

One natural question to ask is how many such solutions there are (assuming some natural equivalence). We provide some results along these lines. We characterize the solutions with all points lying in the peripheral regions of the polygon, and show that there are $n2^{n-5}$ such solutions, and show that for a wide class of polygons no other solutions exist. These solutions are related to the power set of $\{1, 2, \ldots, n-4\}$.

We also present partial results on the polygons where there may be solutions involving points in interior regions. In particular, we characterize which interior regions may contain a point in S, and give some conditions that provide some upper bounds to the number of solutions. (Received October 05, 2004)