Supplemental Material: A Stationary SVBRDF Material Modeling Method Based on Discrete Microsurface

We provide the pseudo code of $\mathcal{P}$-NDF evaluation for re-implementation in alg.1. A challenge part of the evaluation is how to relate the K-clustering method to the scale of rendering. To solve this problem, we change the searching size of clustered K-lobes when ray footprint changes (alg.2). Searching the lobes around boundaries is simple, we also provide the pseudo code in alg.3.

Algorithm 1 $\mathcal{P}$-NDF Evaluatation

```
function EVAL$\mathcal{P}$-NDF($\mathbf{u}$, $\mathbf{s}$, $\mathcal{P}$, $\sigma_r$, $BoundaryDealt$, $NH_I$, $NH_B$)
    $contribution \leftarrow 0.0$
    $aabb \leftarrow$ BOUNDINGBOX($\mathbf{u}, \mathcal{P}, \mathbf{s}, \sigma_r$)
    $L \leftarrow$ NULL
    if $BoundaryDealt$ =TRUE then
        SEARCHBOUNDARYLOBES($NH_B, aabb, L$ )
    end if
    $aabbi \leftarrow$ m($aabb$)
    $maxsize \leftarrow$ MAXCLUSTERSIZE($\mathcal{P}$)
    SEARCHKLOBES($NH_I, aabbi, L, maxsize$)
    for $j = 0$ to $L.size()$ do
        $contribution \leftarrow$ LOBECONTRIBUTION($L[j], \mathbf{u}, \mathbf{s}, \mathcal{P}, \sigma_r$)
    end for
    return $contribution$
end function
```

Algorithm 2 K-lobes Searching

```
function SEARCHKLOBES($node, aabb, L, maxsize$)
    if INTERSECT($aabb, node.aabb$)=FLASE or $node$=NULL then
        return
    end if
    if $node.isleafnode$=TRUE then
        for $i = 0$ to $node$.SIZE( ) do
            if INTERSECT($aabb, node.lobe[i].aabb$) then
                $L$.PUSH($node.lobe[i]$)
            end if
        end for
    else
        $searchchildren \leftarrow$TRUE
        if $node$.SIZE( )$\leq maxsize$ and $node.clustered$ =TRUE then
            for $i = 0$ to $node$.CLUSTEREDNUMBER( ) do
                if INTERSECT($aabb, node.klobe[i].aabb$))=TRUE then
                    $L.push(node.klobe[i])$
                    $searchchildren \leftarrow$FALSE
                end if
            end for
        end if
        if $searchchildren$ = TRUE then
            SEARCHKLOBES($node.leftchild, aabb, L, maxsize$)
            SEARCHKLOBES($node.rightchild, aabb, L, maxsize$)
        end if
    end if
end function
```

Algorithm 3 Boundary Lobes Searching

```
function $\textsc{searchboundarylobes}(node, aabb, L)$
    if $\textsc{intersect}(aabb, node.aabb)$=FLASE or $node$=NULL then
        return
    end if
    if $node.isleafnode$ =TRUE then
        for $i = 0$ to $node.\textsc{size}(\ )$ do
            if $\textsc{intersect}(aabb, node.lobe[i].aabb)$ then
                $L.\textsc{push}(node.lobe[i])$
            end if
        end for
    else
        $\textsc{searchKlobes}(node.leftchild, aabb, L)$
        $\textsc{searchKlobes}(node.rightchild, aabb, L)$
    end if
end function
```

If the texture shows continuity around the boundaries such as leather and brushed metal, we deal with the lobes around the boundaries. The parameter *BoundaryDealt* is TRUE.

If the texture shows a separately features such as the structured material, the parameter *BoundaryDealt* is FALSE and NH_B is NULL.