Hilbert's 13th Problem

SetDirectory["C:\drorbn\AcademicPensieve\2014-11\H13"]
C:\drorbn\AcademicPensieve\2014-11\H13

<< "./.../2009-11/Hilbert13th-Program.m"

ϕ1 := Phi[Identity, 2, 0.3, 2/3];
ϕ2 := Phi[ϕ1, 12, 0, 0.95];

ϕh := Phi[Identity, 2, 0.3, 2/3];
ϕl2 := Phi[ϕh, 12, 0, 0.8];
ϕh3 := Phi[ϕ, ϕ0 → ϕh1, Subdivisions → 12, Slope → 0, FillFactor → 0.8];
g1 = G[f, ϕh1];
g2 = G[f, ϕl2];

Step2Cascade = Rasterize[
  Plot3D[ϕ2[x] + λ * ϕ2[y], {x, 0, 1}, {y, 0, 1},
    PlotPoints → 479, Mesh → 23, ViewPoint → {-2, -2, 1},
    NormalsFunction → None, Boxed → False, Axes → None,
    ColorFunction → Automatic, ColorFunctionScaling → True
  ]
]

Export[
  "Step2Cascade.png",
  ImageCrop[Step2Cascade]
]

Step2Cascade.png
res = 4000;
Timing[
  Step2CascadeWithG2 = Rasterize[
    Plot3D[phi2[x] + \lambda \phi2[y], {x, 0, 1}, {y, 0, 1},
    PlotPoints -> 3 res/4 - 1, Mesh -> 11, ViewPoint -> {-2, -2, 1},
    NormalsFunction -> None, ColorFunction -> (Hue[g2[#3]] &),
    ImageSize -> res, Axes -> None, Boxed -> False
    ], ImageSize -> res, RasterSize -> res
  ];
]

InterpolatingFunction::dmval :
  Input value \{6.93443 \times 10^{-7}\} lies outside the range of data in the interpolating function. Extrapolation will be used. 

InterpolatingFunction::dmval :
  Input value \{0.1\} lies outside the range of data in the interpolating function. Extrapolation will be used. 

InterpolatingFunction::dmval :
  Input value \{0.1\} lies outside the range of data in the interpolating function. Extrapolation will be used. 

General::stop : Further output of InterpolatingFunction::dmval will be suppressed during this calculation. 

{2.932819, Null}

Export[
  "Step2CascadeWithG2.png",
  Step2CascadeWithG2, ImageSize -> res, RasterSize -> res
]
Step2CascadeWithG2.png