

Pensieve header: Planet Earth pulled back to the Hopf fibration - G8 (first) runs.

```
SetDirectory["C:\\drorbn\\AcademicPensieve\\Projects\\PlanetHopf"];
<< PlanetHopf-Programs.m

MakeColourScheme[AllCountries, {
  {"Canada", "Greenland"}, {"Canada", "Russia"},
  {"UnitedStates", "Russia"}, {"Canada", "Mexico"},
  {"Malaysia", "PapuaNewGuinea"}, {"Japan", "Russia"}, {"Japan", "SouthKorea"},
  {"Kazakhstan", "Mongolia"}, {"Australia", "NewZealand"},
  {"Australia", "Indonesia"}, {"Australia", "PapuaNewGuinea"},
  {"China", "Japan"}, {"China", "SouthKorea"}, {"NorthKorea", "Japan"},
  {"UnitedStates", "Greenland"}, {"Greenland", "Russia"},
  {"Pakistan", "Tajikistan"}, {"Canada", "Japan"}, {"Canada", "Italy"},
  {"Italy", "Japan"}, {"Italy", "Germany"}, {"France", "UnitedKingdom"}
}];
LoadColourScheme["101127-222611"]

Country colouring process changes:
{31.9167, 7.76175, 3.0396, 1.92965, 1.45015, 1.59796, 0.460388, 0.298527, 0.222012,
 0.171413, 0.133177, 0.104212, 0.0830234, 0.0725434, 0.0630604, 0.0548308}
```

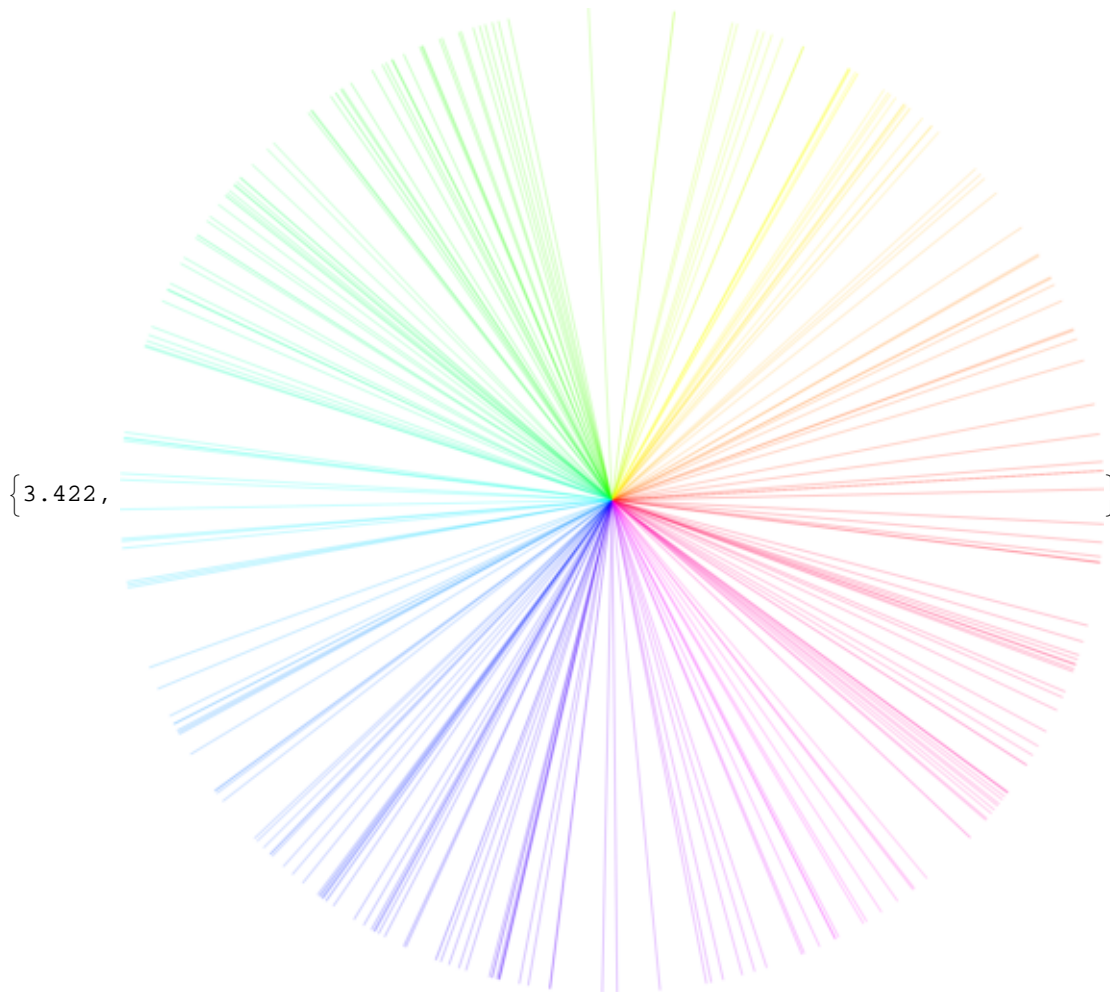
{AllCountries, G20, G8}

```

{{Afghanistan, Albania, Algeria, AmericanSamoa, Andorra, Angola, Anguilla,
  AntiguaBarbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan,
  Bahamas, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bermuda,
  Bhutan, Bolivia, BosniaHerzegovina, Botswana, Brazil, BritishVirginIslands,
  Brunei, Bulgaria, BurkinaFaso, Burundi, Cambodia, Cameroon, Canada, CapeVerde,
  CaymanIslands, CentralAfricanRepublic, Chad, Chile, China, ChristmasIsland,
  CocosKeelingIslands, Colombia, Comoros, CookIslands, CostaRica, Croatia, Cuba,
  Cyprus, CzechRepublic, DemocraticRepublicCongo, Denmark, Djibouti, Dominica,
  DominicanRepublic, EastTimor, Ecuador, Egypt, ElSalvador, EquatorialGuinea,
  Eritrea, Estonia, Ethiopia, FalklandIslands, FaroeIslands, Fiji, Finland,
  France, FrenchGuiana, FrenchPolynesia, Gabon, Gambia, GazaStrip, Georgia,
  Germany, Ghana, Gibraltar, Greece, Greenland, Grenada, Guadeloupe, Guam,
  Guatemala, Guernsey, Guinea, GuineaBissau, Guyana, Haiti, Honduras, HongKong,
  Hungary, Iceland, India, Indonesia, Iran, Iraq, Ireland, IsleOfMan, Israel,
  Italy, IvoryCoast, Jamaica, Japan, Jersey, Jordan, Kazakhstan, Kenya,
  Kiribati, Kosovo, Kuwait, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia,
  Libya, Liechtenstein, Lithuania, Luxembourg, Macau, Macedonia, Madagascar,
  Malawi, Malaysia, Maldives, Mali, Malta, MarshallIslands, Martinique,
  Mauritania, Mauritius, Mayotte, Mexico, Micronesia, Moldova, Monaco,
  Mongolia, Montenegro, Montserrat, Morocco, Mozambique, Myanmar, Namibia,
  Nauru, Nepal, Netherlands, NetherlandsAntilles, NewCaledonia, NewZealand,
  Nicaragua, Niger, Nigeria, Niue, NorfolkIsland, NorthernMarianaIslands,
  NorthKorea, Norway, Oman, Pakistan, Palau, Panama, PapuaNewGuinea, Paraguay,
  Peru, Philippines, PitcairnIslands, Poland, Portugal, PuertoRico, Qatar,
  RepublicCongo, Reunion, Romania, Russia, Rwanda, SaintHelena, SaintKittsNevis,
  SaintLucia, SaintPierreMiquelon, SaintVincentGrenadines, Samoa, SanMarino,
  SaoTomePrincipe, SaudiArabia, Senegal, Serbia, Seychelles, SierraLeone,
  Singapore, Slovakia, Slovenia, SolomonIslands, Somalia, SouthAfrica,
  SouthKorea, Spain, SriLanka, Sudan, Suriname, Svalbard, Swaziland, Sweden,
  Switzerland, Syria, Taiwan, Tajikistan, Tanzania, Thailand, Togo, Tokelau,
  Tonga, TrinidadTobago, Tunisia, Turkey, Turkmenistan, TurksCaicosIslands,
  Tuvalu, Uganda, Ukraine, UnitedArabEmirates, UnitedKingdom, UnitedStates,
  UnitedStatesVirginIslands, Uruguay, Uzbekistan, Vanuatu, VaticanCity, Venezuela,
  Vietnam, WallisFutuna, WestBank, WesternSahara, Yemen, Zambia, Zimbabwe}},
{Argentina, Australia, Brazil, Canada, China, France, Germany,
  India, Indonesia, Italy, Japan, Mexico, Russia, SaudiArabia,
  SouthAfrica, SouthKorea, Turkey, UnitedKingdom, UnitedStates},
{Canada, France, Germany, Italy, Japan, Russia, UnitedKingdom, UnitedStates}}

```

```
MakeImage["ColourWheel", Graphics[  
  {  
    Hue[c = CountryColour[#]],  
    Line[{{0, 0}, {Cos[2 Pi c], Sin[2 Pi c]}}]  
  } & /@ AllCountries  
]]
```

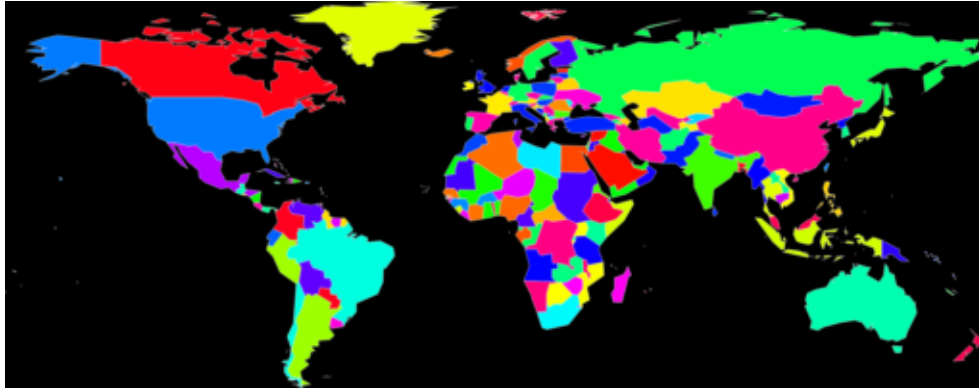


```

MakeImage["BaseMap", Graphics[{
  EdgeForm[White],
  {
    Hue[CountryColour[#]],
    CountryShape[#] /.
      {CountryShape → List, Region[pts___] ⇒ Polygon[{pts} /. LonLat → List]}
  } & /@
  (AllCountries)
}, Background → Black]]

```

{3.812,



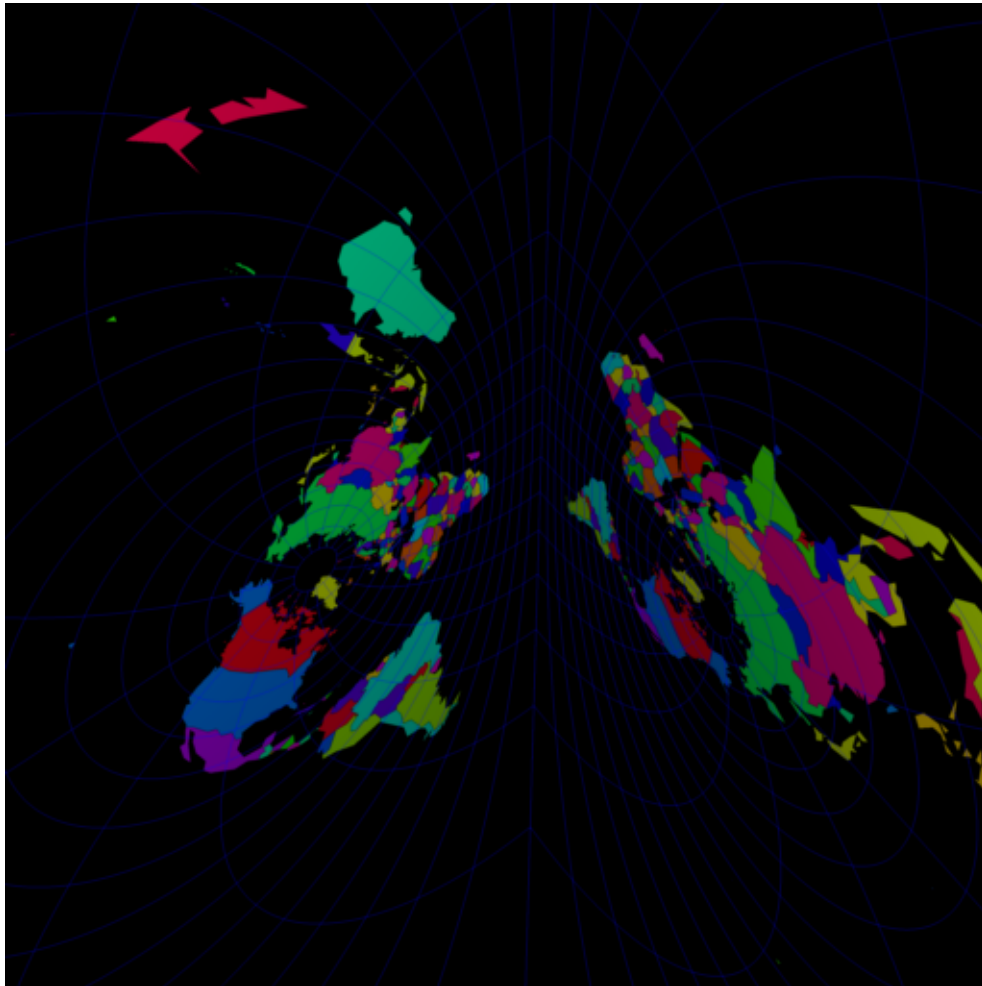
(* SaveColourScheme[] *)

```

beta = (-90 + 1 / Sqrt[5]) Degree;
MakeImage["FramingExercise", Graphics3D[{
  Whirl[#,
    WhirlBottom -> 40 Degree, WhirlTop -> 320 Degree, WhirlingSteps -> 0
  ] & /@ AllCountries,
  grid
}]]

```

{10.907,



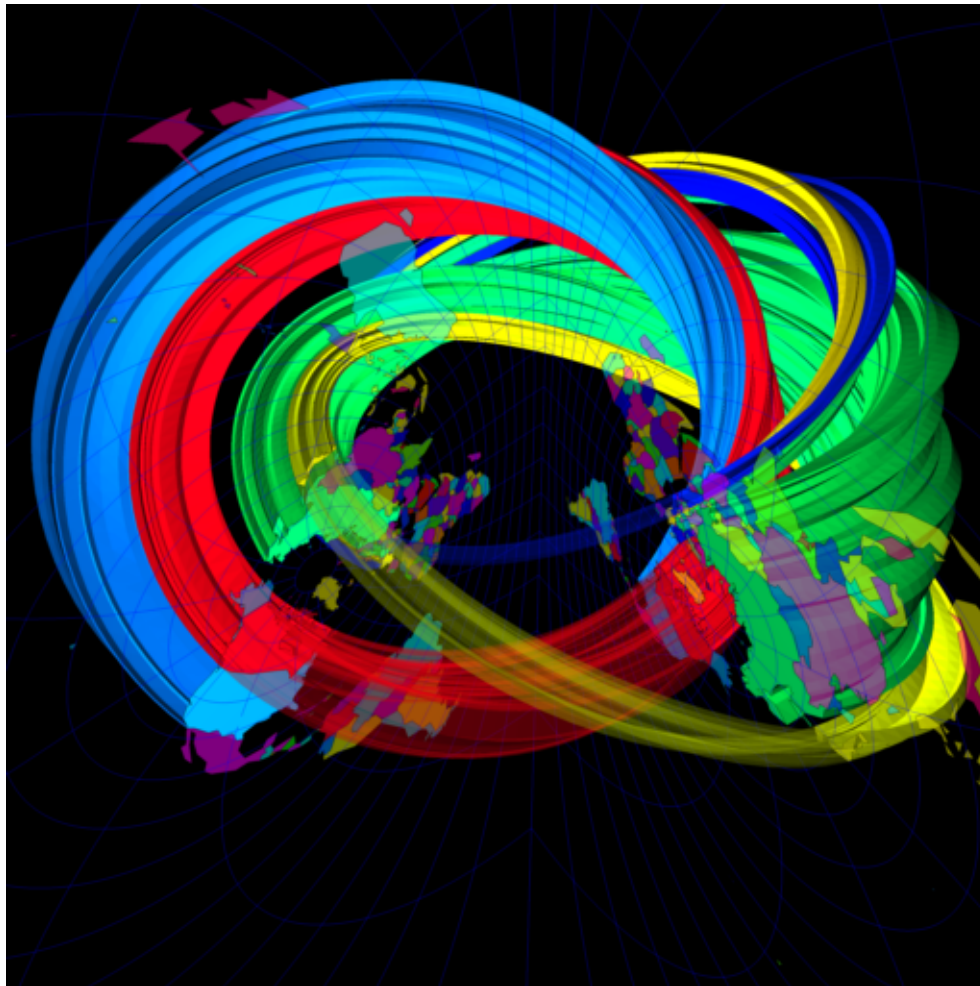
```

wc = G20;
wc = {"Canada", "China", "France", "Mexico"};
wc = G8;
wg8 := {
  Whirl[#,
    WhirlBottom → 40 Degree, WhirlTop → 320 Degree, WhirlingSteps → 120,
    WhirlRegions → If[# === "Japan", 4, 1],
    TopStyle → {Glow[Hue[CountryColour[#]]]},
    BottomStyle → {Opacity[1]}
  ] & /@ wc,
  Whirl[#,
    WhirlBottom → -40 Degree, WhirlTop → 40 Degree,
    WhirlRegions → If[# === "Japan", 4, 1],
    WhirlStyle → {Opacity[0.2]},
    TopStyle → {Opacity[0]}, BottomStyle → {Opacity[0]}
  ] & /@ {"Canada", "Italy", "Japan"},
  Whirl[#,
    WhirlBottom → -40 Degree, WhirlTop → 40 Degree, WhirlingSteps → 0,
    TopStyle → {Opacity[0.5], Glow[Hue[CountryColour[#]]]},
    BottomStyle → {Opacity[0.5], Glow[Hue[CountryColour[#]]]}
  ] & /@ Complement[AllCountries, {}],
  grid
};

```

```
beta = (-90 + 1 / Sqrt[5]) Degree;  
MakeImage["WhirlG8", Graphics3D[wg8]]
```

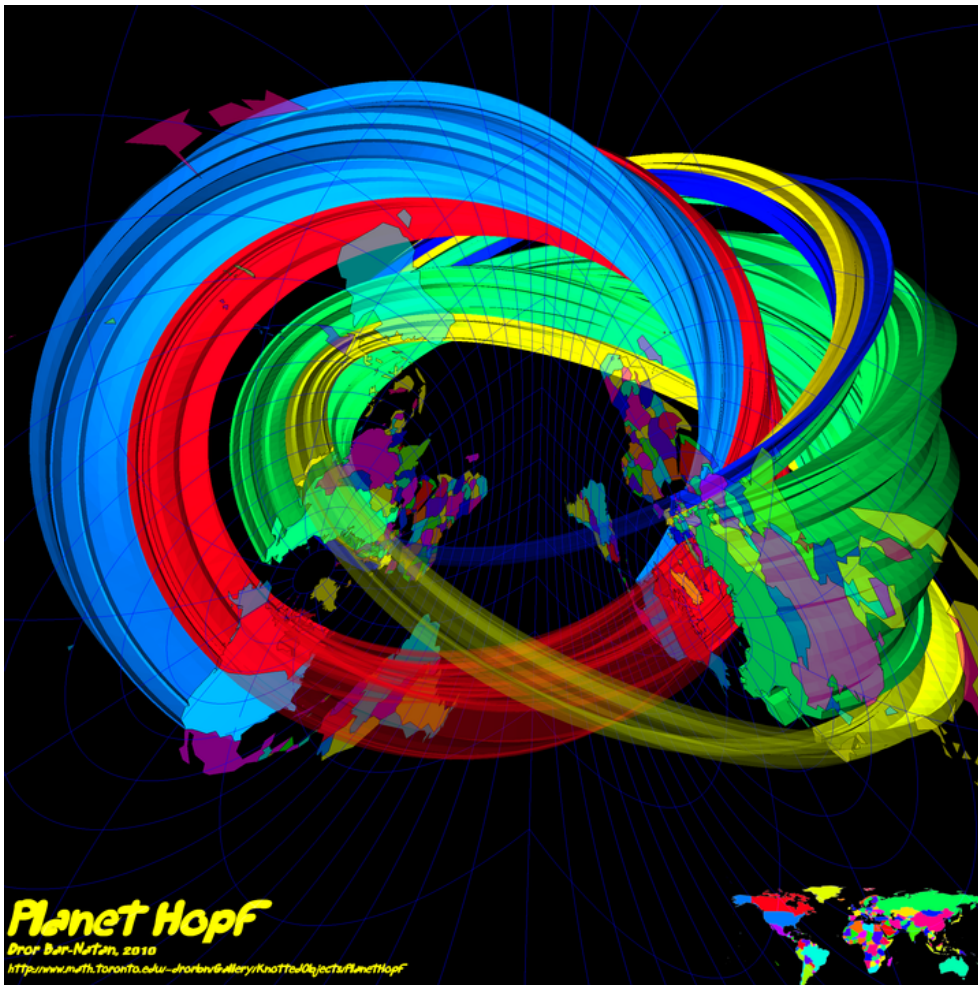
{91.75,



```

Run["convert -resize 640x640 BaseMap.png BaseMap_640.png"];
Run["convert WhirlG8.png BaseMap_640.png -gravity
      SouthEast -compose lighten -composite PlanetHopf.png"];
Run["convert PlanetHopf.png Label.png -gravity SouthWest
      -compose lighten -composite PlanetHopf.png"];
Run["convert -resize 120x120 PlanetHopf.png PlanetHopf_120.png"];
Run["convert -resize 720x720 PlanetHopf.png PlanetHopf_720.png"];
Run["convert -resize 240x240 PlanetHopf.png PlanetHopf_240.png"];
Show[
  Import["PlanetHopf_720.png"],
  ImageSize -> 512
]

```



```
Dynamic[Show[frame, ImageSize -> 512]]
```

```
Show[frame, ImageSize -> 512]
```




```
Do[
  fname =
    StringJoin@@Flatten[{"Frames/", ToString /@ IntegerDigits[n, 10, 3], ".png"}];
  beta = (n + 1 / Sqrt[5]) Degree;
  frame = Rasterize[
    Graphics3D[wg8, ImageSize -> 720],
    RasterSize -> 720, ImageSize -> 720
  ];
  Export[fname, frame],
  {n, 0, 359}
]
```