## Next wave: wave 3

### Training wave 3 emulators

``` {r}

sampling <- sample(nrow(wave3), 40)

train3 <- wave3[sampling,1:9]

valid3 <- wave3[!seq\_along(wave3[,1])%in%sampling,1:9]

new\_new\_new\_ranges <- map(names(ranges), ~c(min(wave3[,.]), max(wave3[,.]))) %>% setNames(names(ranges))

ems3 <- emulator\_from\_data(train3, output\_names, new\_new\_new\_ranges, quadratic = T)

deltas <- apply(wave3[,10:14], 2, mean)/map\_dbl(ems3, ~.$u\_sigma)

ems3 <- emulator\_from\_data(train3, output\_names, new\_new\_new\_ranges, deltas = deltas, quadratic = TRUE)

for (i in 1:length(ems3)) ems3[[i]]$output\_name <- output\_names[i]

ems3\_adjusted <- map(seq\_along(ems3), ~ems3[[.]]$adjust(train3, output\_names[[.]]))

names(ems3\_adjusted) <- output\_names

```

### Evaluating implausibility across all waves

As before, we need to consider implausibility across all waves, rather than just the wave under consideration at the time.

``` {r}

all\_waves <- c(ems0\_adjusted, ems1\_adjusted, ems2\_adjusted, ems3\_adjusted)

all\_targets <- c(targets, targets, targets, targets)

emulator\_plot(all\_waves, var = 'maximp', targets = all\_targets)

```

To generate new parameter sets:

```{r}

new\_new\_new\_new\_points <- generate\_new\_runs(all\_waves, ranges, n\_points = 120, z = all\_targets)

plot(new\_new\_new\_new\_points, pch = 16, cex = 0.5)

```

## Next wave: wave 4

To train new emulators we need to create `wave4`:

```{r}

next\_next\_next\_next\_wave <- getOutputs(new\_new\_new\_new\_points, seq(10,30,by=5))

wave4 <- data.frame(cbind(new\_new\_new\_new\_points,next\_next\_next\_next\_wave))%>%

setNames(c(names(ranges),paste0("I",seq(10,30,by=5)), paste0("EV",seq(10,30,by=5))))

```

### Training wave 4 emulators

``` {r}

sampling <- sample(nrow(wave4), 40)

train4 <- wave4[sampling,1:9]

valid4 <- wave4[!seq\_along(wave4[,1])%in%sampling,1:9]

new\_new\_new\_new\_ranges <- map(names(ranges), ~c(min(wave4[,.]), max(wave4[,.]))) %>% setNames(names(ranges))

ems4 <- emulator\_from\_data(train4, output\_names, new\_new\_new\_new\_ranges, quadratic = T)

deltas <- apply(wave4[,10:14], 2, mean)/map\_dbl(ems4, ~.$u\_sigma)

ems4 <- emulator\_from\_data(train4, output\_names, new\_new\_new\_new\_ranges, deltas = deltas, quadratic = TRUE)

for (i in 1:length(ems4)) ems4[[i]]$output\_name <- output\_names[i]

ems4\_adjusted <- map(seq\_along(ems4), ~ems4[[.]]$adjust(train4, output\_names[[.]]))

names(ems4\_adjusted) <- output\_names

```

### Evaluating implausibility across all waves

As before, we need to consider implausibility across all waves, rather than just the wave under consideration at the time.

``` {r}

all\_waves <- c(ems0\_adjusted, ems1\_adjusted, ems2\_adjusted, ems3\_adjusted, ems4\_adjusted)

all\_targets <- c(targets, targets, targets, targets, targets)

emulator\_plot(all\_waves, var = 'maximp', targets = all\_targets)

```

To generate new parameter sets:

```{r}

new\_new\_new\_new\_new\_points <- generate\_new\_runs(all\_waves, ranges, n\_points = 120, z = all\_targets)

plot(new\_new\_new\_new\_new\_points, pch = 16, cex = 0.5)

```